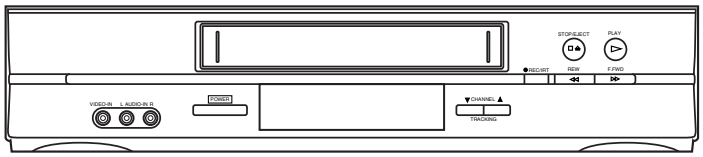
HITACHI

SERVICE MANUAL

TK | No. 5101E

VT-FX665A
VT-FX665AC



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VHS

This video deck is VHS type video recorder. For proper operation, only the VHS type cassette must be used.

SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

VIDEO CASSETTE RECORDER

March 2001 Digital Media Products Division, Tokai

MAIN SECTION

VIDEO CASSETTE RECORDER

VT-FX665A
VT-FX665AC

MAIN SECTION

- **Specifications**
- **Preparation for Servicing**
- **Adjustment Procedures**
- **Schematic Diagrams**
- **CBA' s**

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SPECIFICATIONS

Description	Unit	Minimum	Nominal	Maximum	Condition
1. Video					
1-1 Video Output (PB)	Vp-p	0.8	1.0	1.2	
1-2 Video Output (R/P)	Vp-p	0.8	1.0	1.2	
1-3 Video S/N Y (R/P)	dB	41	44		SP Mode
1-4 Video Color S/N AM (R/P)	dB	35	44		SP Mode
1-5 Video Color S/N PM (R/P)	dB	33	37		SP Mode
1-6 Resolution (PB)	Line	210	230		SP Mode
2. Servo					
2-1 Jitter Low (R/P)	μs		0.05	0.1	SP Mode
2-2 Wow & Flutter (R/P)	%		0.2	0.4	SP Mode
3. Normal Audio					
3-1 Output (PB)	dBV	-10	-6	-2	
3-2 Output (R/P)	dBV	-10	-6	-2	SP Mode
3-3 S/N (R/P)	dB	38	43		SP Mode
3-4 Distortion (R/P)	%		2	4.0	SP Mode
3-5 Freq. response (R/P) at 200Hz	dB	-6	0		SP Mode
(-20dB ref. 1kHz) at 8kHz	dB	-6	-1.5		SP Mode
4. Tuner					
4-1 Video Output	Vp-p	0.8	1.0	1.2	E-E Mode
4-2 Video S/N (S/N Y signal)	dB	40	47		E-E Mode
4-3 Audio Output (1kHz)	dBV	-10	-6	-4	E-E Mode
4-4 Audio S/N (1kHz)	dB	40	46		E-E Mode

Note: Nominal specs represent the design specs. All units should be able to approximate these – some will exceed and some may drop slightly below these specs. Limit specs represent the absolute worst condition that still might be considered acceptable; In no case should a unit fail to meet limit specs.

IMPORTANT SAFETY PRECAUTIONS

Product Safety Notice

Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc. Parts that have special safety characteristics are identified by a ⚠ on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. The Product's Safety is under review continuously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are carefully inspected to confirm with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

Precautions during Servicing

A. Parts identified by the ⚠ symbol are critical for safety. Replace only with part number specified.

B. In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements.

Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.

C. Use specified internal wiring. Note especially:

1) Wires covered with PVC tubing

2) Double insulated wires

3) High voltage leads

D. Use specified insulating materials for hazardous live parts. Note especially:

1) Insulation tape

2) PVC tubing

3) Spacers

4) Insulators for transistors

E. When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.

F. Observe that the wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.).

G. Check that replaced wires do not contact sharp edges or pointed parts.

H. When a power cord has been replaced, check that 5 - 6 kg of force in any direction will not loosen it.

I. Also check areas surrounding repaired locations.

J. Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

K. Crimp type wire connector

The power transformer uses crimp type connectors which connect the power cord and the primary side of the transformer. When replacing the transformer, follow these steps carefully and precisely to prevent shock hazards.

Replacement procedure

1) Remove the old connector by cutting the wires at a point close to the connector.

Important: Do not re-use a connector. (Discard it.)

2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

4) Use a crimping tool to crimp the metal sleeve at its center. Be sure to crimp fully to the complete closure of the tool.

L. When connecting or disconnecting the internal connectors, first, disconnect the AC plug from the AC outlet.

Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts, and wires have been returned to their original positions. Afterwards, do the following tests and confirm the specified values to verify compliance with safety standards.

1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance (d) and (d') between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1)

Table 1 : Ratings for selected area

AC Line Voltage	Clearance Distance (d) (d')
120 V	≥ 3.2 mm (0.126 inches)

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

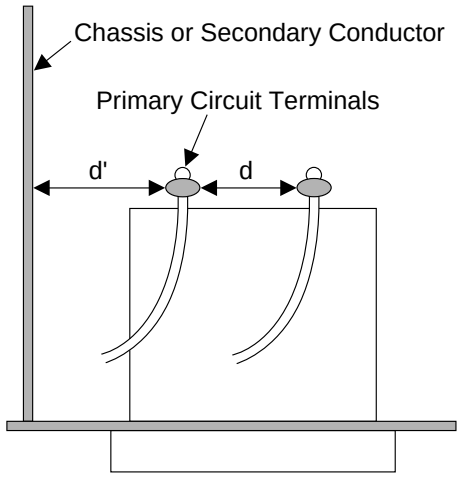


Fig. 1

2. Leakage Current Test

Confirm the specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) is lower than or equal to the specified value in the table below.

Measuring Method (Power ON) :

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across the terminals of load Z. See Fig. 2 and the following table.

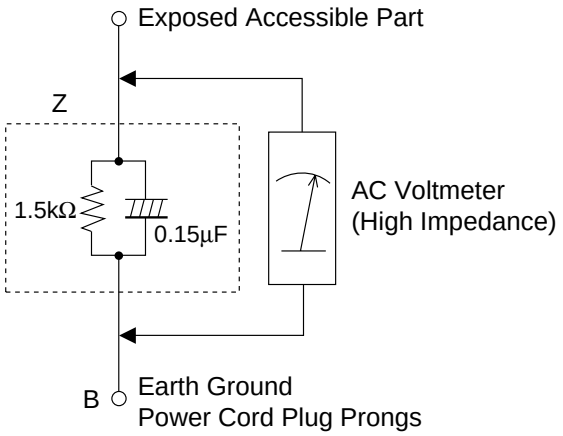


Fig. 2

Table 2 : Leakage current ratings for selected areas

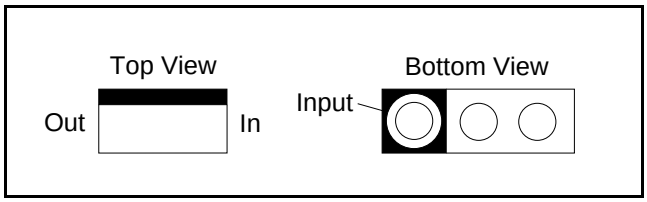
AC Line Voltage	Load Z	Leakage Current (i)	Earth Ground (B) to:
120 V	0.15μF CAP. & 1.5kΩ RES. Connected in parallel	i ≤ 0.5mA Peak	Exposed accessible parts

Note: This table is unofficial and for reference only. Be sure to confirm the precise values.

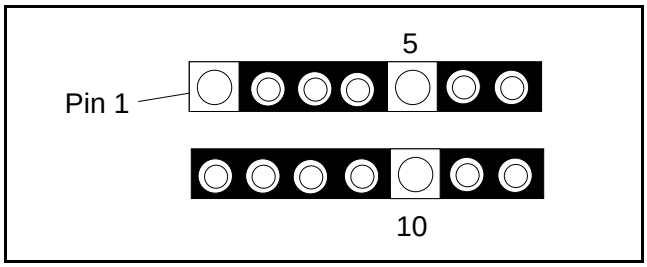
STANDARD NOTES FOR SERVICING

Circuit Board Indications

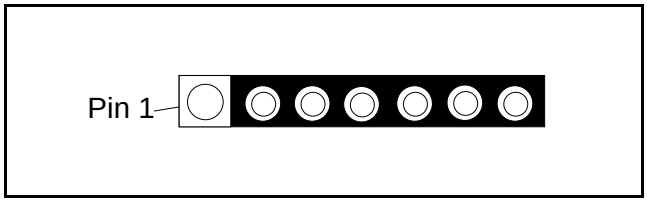
a. The output pin of the 3 pin Regulator ICs is indicated as shown.



b. For other ICs, pin 1 and every fifth pin are indicated as shown.

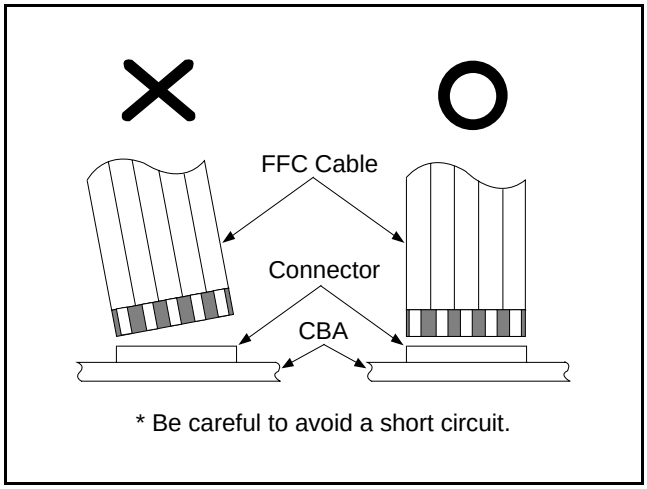


c. The 1st pin of every male connector is indicated as shown.



Instructions for Connectors

1. When you connect or disconnect the FFC (Flexible Foil Connector) cable, be sure to first disconnect the AC cord.
2. FFC (Flexible Foil Connector) cable should be inserted parallel into the connector, not at an angle.



How to Remove / Install Flat Pack-IC

1. Removal

With Hot-Air Flat Pack-IC Desoldering Machine:

(1) Prepare the hot-air flat pack-IC desoldering machine, then apply hot air to the Flat Pack-IC (about 5 to 6 seconds). (Fig. S-1-1)

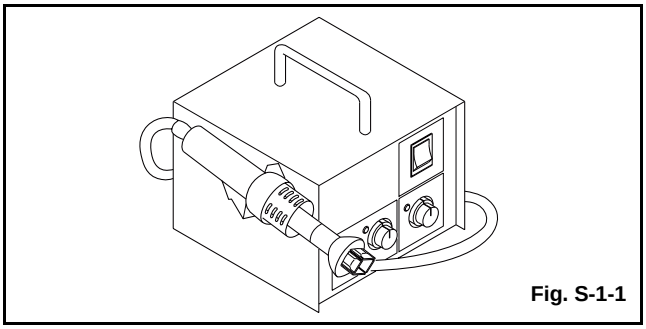


Fig. S-1-1

(2) Remove the flat pack-IC with tweezers while applying the hot air.

(3) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

(4) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

Caution:

1. Do not supply hot air to the chip parts around the flat pack-IC for over 6 seconds because damage to the chip parts may occur. Put masking tape around the flat pack-IC to protect other parts from damage. (Fig. S-1-2)
2. The flat pack-IC on the CBA is affixed with glue, so be careful not to break or damage the foil of each pin or the solder lands under the IC when removing it.

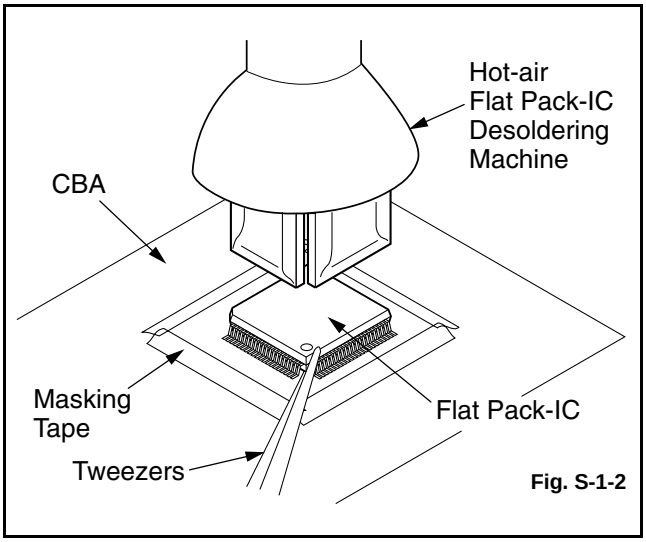


Fig. S-1-2

With Soldering Iron:

(1) Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)

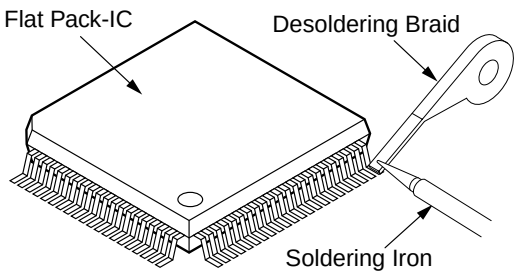


Fig. S-1-3

(2) Lift each lead of the flat pack-IC upward one by one, using a sharp pin or wire to which solder will not adhere (iron wire). When heating the pins, use a fine tip soldering iron or a hot air desoldering machine. (Fig. S-1-4)

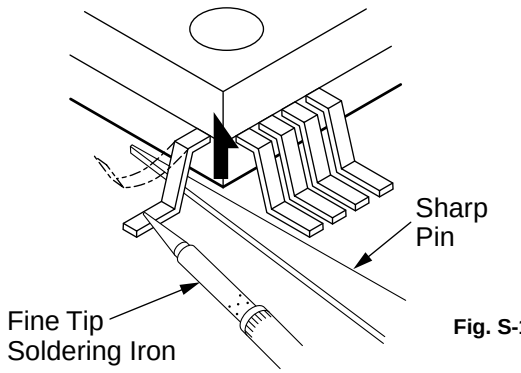


Fig. S-1-4

(3) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

(4) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

With Iron Wire:

(1) Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)

(2) Affix the wire to a workbench or solid mounting point, as shown in Fig. S-1-5.

(3) While heating the pins using a fine tip soldering iron or hot air blower, pull up the wire as the solder melts so as to lift the IC leads from the CBA contact pads as shown in Fig. S-1-5.

(4) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

(5) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

Note:

When using a soldering iron, care must be taken to ensure that the flat pack-IC is not being held by glue. When the flat pack-IC is removed from the CBA, handle it gently because it may be damaged if force is applied.

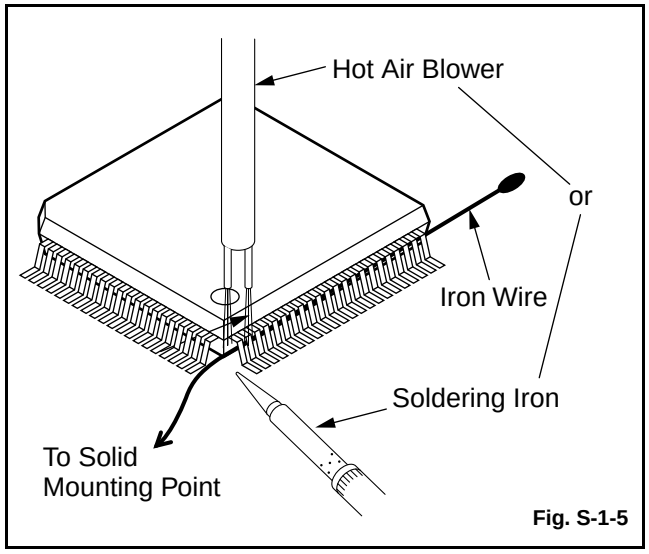


Fig. S-1-5

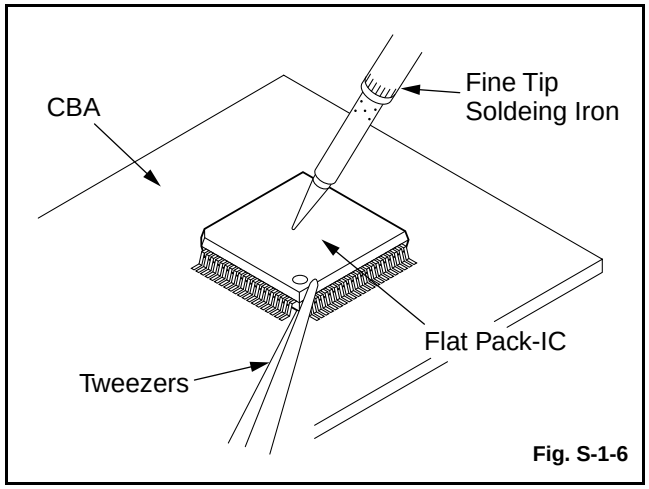


Fig. S-1-6

2. Installation

(1) Using desoldering braid, remove the solder from the foil of each pin of the flat pack-IC on the CBA so you can install a replacement flat pack-IC more easily.

(2) The " ● " mark on the flat pack-IC indicates pin 1. (See Fig. S-1-7.) Be sure this mark matches the 1 on the PCB when positioning for installation. Then pre- solder the four corners of the flat pack-IC. (See Fig. S-1-8.)

(3) Solder all pins of the flat pack-IC. Be sure that none of the pins have solder bridges.

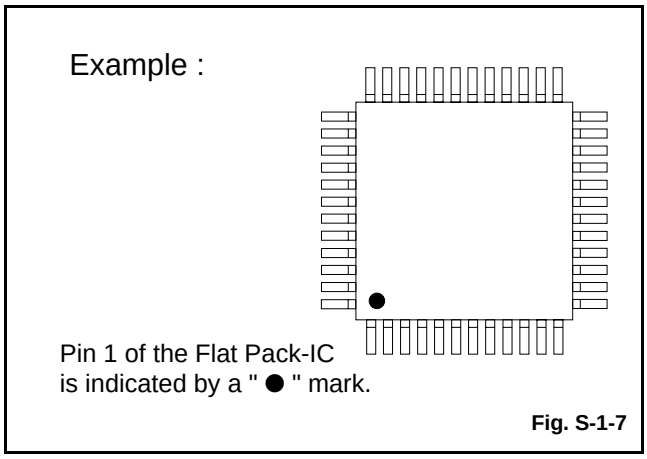


Fig. S-1-7

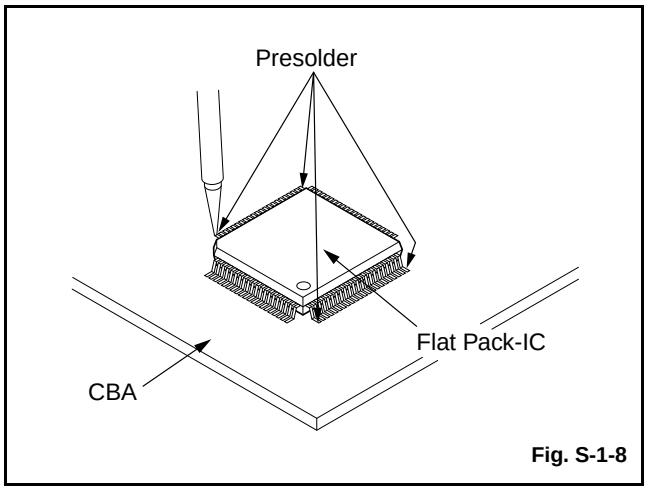


Fig. S-1-8

Instructions for Handling Semiconductors

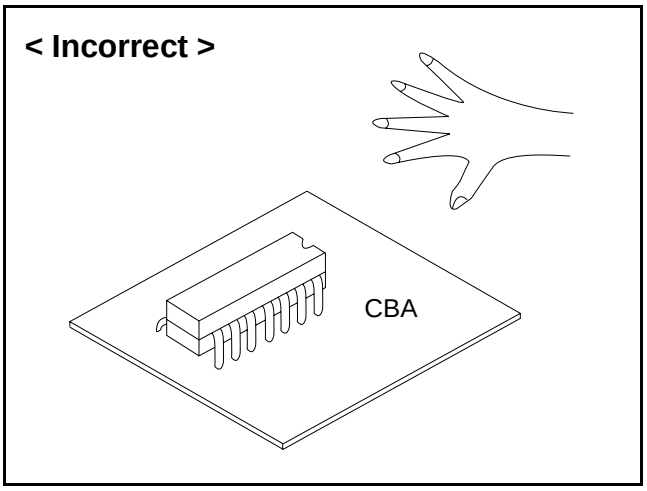
Electrostatic breakdown of the semiconductors may occur due to a potential difference caused by electro-static charge during unpacking or repair work.

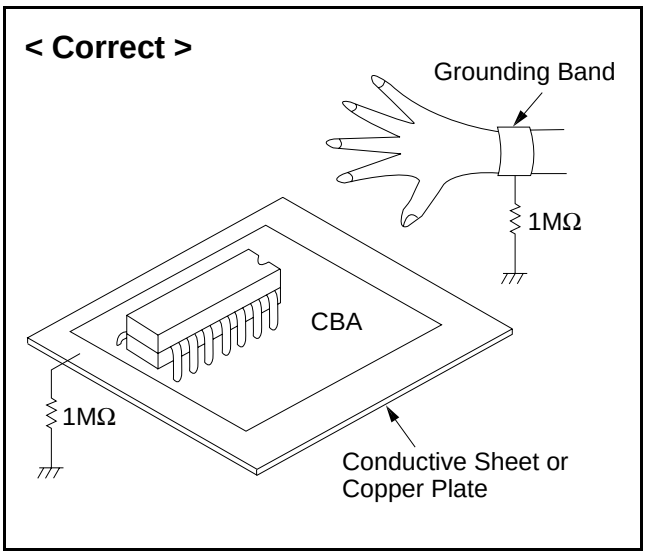
1. Ground for Human Body

Be sure to wear a grounding band (1MΩ) that is properly grounded to remove any static electricity that may be charged on the body.

2. Ground for Workbench

Be sure to place a conductive sheet or copper plate with proper grounding (1MΩ) on the workbench or other surface, where the semiconductors are to be placed. Because the static electricity charge on clothing will not escape through the body grounding band, be careful to avoid contacting semiconductors with your clothing.





PREPARATION FOR SERVICING

How to Enter the Service Mode

About Optical Sensors

Caution:

An optical sensor system is used for the Tape Start and End Sensors on this equipment. Carefully read and follow the instructions below. Otherwise the unit may operate erratically.

What to do for preparation

Insert a tape into the Deck Mechanism Assembly and press the PLAY button. The tape will be loaded into the Deck Mechanism Assembly. Make sure the power is on, connect TP502 (SENSOR INHIBITION) to TP511 (GROUND). This will stop the function of Tape Start Sensor, Tape End Sensor and Reel Sensors. (If these TPs are connected before plugging in the unit, the function of the sensors will stay valid.) See Fig. 1.

Note: Because the Tape End Sensors are inactive, do not run a tape all the way to the start or the end of the tape to avoid tape damage.

About REC-Safety Switch

Caution:

The REC-Safety Switch is directly mounted on the Main CBA. When the Deck Mechanism Assembly is removed from the Main CBA for servicing, this switch does not work automatically.

What to do for preparation

In order to record, press the Rec button while pushing REC-SAFETY SW on the Main CBA. See Fig. 1.

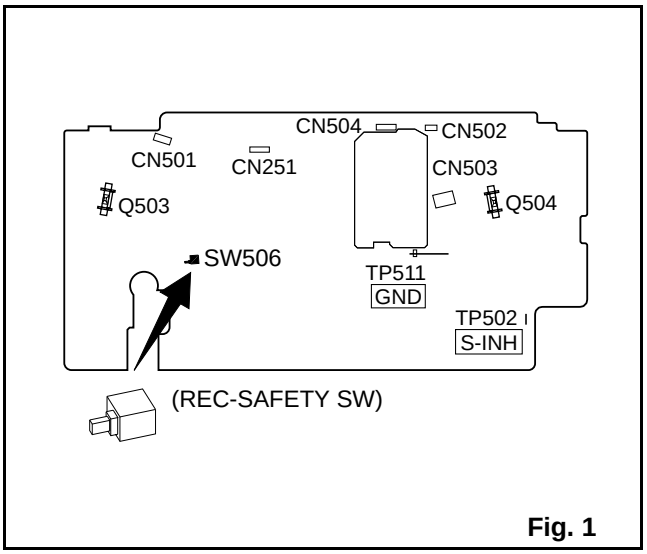
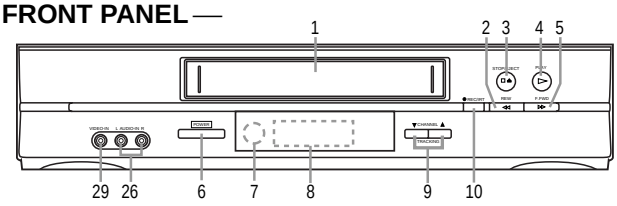


Fig. 1

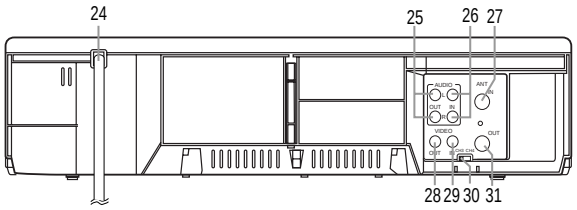
OPERATING CONTROLS AND FUNCTIONS

Model: VT-FX665A / VT-FX665AC

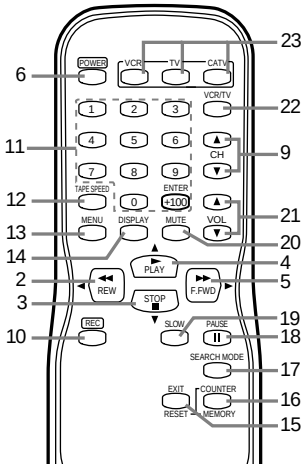
—VCR FRONT PANEL —



—VCR REAR PANEL —



—REMOTE CONTROL —



1. Cassette Compartment

2. REW button– Press to rewind the tape, or to view the picture rapidly in reverse during the playback mode. (Rewind Search)

◄ button– Press to cancel a setting of timer program. Press to correct digits when setting program (For example: setting clock or timer program). Press to add or delete channel numbers during channel preset. (only on the remote control)

3. STOP button– Press to stop the tape motion.

EJECT button– Press to remove a tape from the VCR. (only on the VCR)

▼ button– Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)

4. PLAY button– Press to begin playback.

▲ button– Press to enter digits when setting program (For example: setting clock or timer program). Press to select the setting modes from the on screen menu. (only on the remote control)

5. F.FWD button– Press to rapidly advance the tape, or view the picture rapidly in forward during playback. (Forward Search)

► button– When setting program (For example: setting clock or timer program), press to determine your selection and proceed to the next step you want to input. Press to determine the setting modes from the on screen menu. Press to add or delete channel numbers during channel preset. (only on the remote control)

6. POWER button– Press to turn VCR on and off. Press to activate timer recording.

7. Remote sensor window– Receives the infrared signals from the remote control.

8. Digital display

A. PWR. (Power) indicator– Indicates that the power is turned on.

B. Cassette indicator– Indicates that there is a tape in the VCR.

C. VCR indicator– Indicates that the VCR is in the VCR position.

D. REC indicator– Indicates that it is recording. Flashes when a recording has been paused.

E. ☑ (Timer) indicator– Indicates that the timer recording or an IRT recording has been set.

F. CLOCK indicator– Displays current time. PM indicator appears when p.m.

9. CHANNEL(CH) ▲/▼ buttons– Press to select the desired channels for viewing or recording.

Tracking function– Press to minimize video 'noise' (lines or dots on screen) during playback (only on the VCR) or slow mode.

Press to stabilize the picture in the Still mode when the picture begins to vibrate vertically.

10. **REC button–** Press for manual recording.

    IRT button– Press to activates Instant Recording Timer. (only on the VCR)

11. **NUMBER buttons–** Press to select desired channels for viewing or recording. To select channels from 1 to 9, first press "0" button then 1 to 9. (only on the remote control)

    +100 button– When selecting cable channels which are higher than 99, press this button first, then press the last two digits. (To select channel 125, first press "+100" button then press "2" and "5"). (only on the remote control)

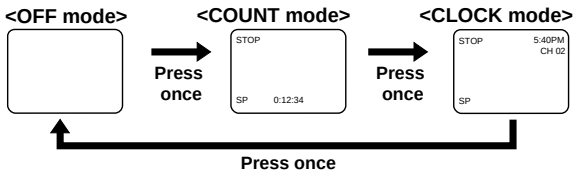
    ENTER- (only on the remote control)

12. **TAPE SPEED button–** Press to choose the desired recording speed : SP/SLP. (only on the remote control)

13. **MENU button–** Press to display the menu on the TV screen. Press to exit the menu on the TV screen. (only on the remote control)

14. **DISPLAY button–** Press to display the current time, channel number, real time tape counter, and other information on the TV screen. (only on the remote control)

    Each time you press this button, TV screen will change as shown. The status display (STOP, PLAY etc.) and the tape speed display (SP, LP (playback only), or SLP) will disappear after 5 seconds.



15. **COUNTER RESET button–** Press to reset counter to 0:00:00. (only on the remote control)

    EXIT button– Press to exit the menu on the TV screen. (only on the remote control)

16. **COUNTER MEMORY button–** Press to set counter memory on and off. (only on the remote control)

17. **SEARCH MODE button–** Press to perform a Time Search or an Index Search. (only on the remote control)

18. **PAUSE button–** Press to temporarily stop the tape during recording or to view a still picture during playback. (only on the remote control)

    Frame Advance function– Press to advance the picture by one frame at a time during the still mode. (only on the remote control)

19. **SLOW button–** Press to start slow motion playback. (only on the remote control)

20. **MUTE button–** Press to mute the TV's sound. Press it again to resume the sound. (only on the remote control)

21. **VOL(ume) buttons–** Press to adjust the desired TV's volume level by using either ▲ or ▼ button. (only on the remote control)

22. **VCR/TV button–** Press to select TV or VCR mode. (only on the remote control)

    VCR position: to view playback, to monitor video recordings or watch TV using the VCR tuner.

    TV position: to watch TV or to view one program while recording another.

23. **MODE SELECT buttons**
    (only on the remote control)

    CATV button

    TV button

    VCR button

24. **Power cord–** Connect to a standard AC outlet (120V/60Hz).

25. **AUDIO OUT jacks–** Connect to the audio input jacks of your audio equipment or another VCR.

26. **AUDIO IN jacks–** Connect to the audio output jacks of your audio equipment or another VCR.

27. **ANT. IN terminal–** Connect to an antenna, Cable system or Satellite system.

28. **VIDEO OUT jack–** Connect to the video input jack of your video camera or another VCR.

29. **VIDEO IN jack–** Connect to the video output jack of your video camera or another VCR.

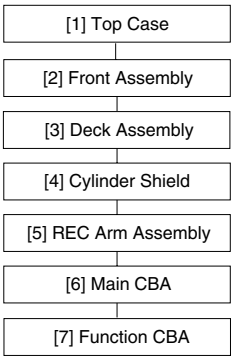
30. **CH3/CH4 selector switch–** Use to select a video output channel (3 or 4) for VCR playback.

31. **ANT. OUT terminal–** Connects to the antenna input terminal on your TV.

CABINET DISASSEMBLY INSTRUCTIONS

1. Disassembly Flowchart

This flowchart indicates the disassembly steps to gain access to item(s) to be serviced. When reassembling, follow the steps in reverse order. Bend, route, and dress the cables as they were originally.



Disassembly Method

ID/ LOC. No.	PART	REMOVAL		
		Fig. No.	REMOVE/ *UNHOOK/UNLOCK/ RELEASE/UNPLUG/ DESOLDER	Note
[1]	Top Case	1	3(S-1)	-
[2]	Front Assembly	2	*3(L-1), *4(L-2)	-
[3]	Deck Assembly	3	6(S-2), Spacer, *(CN251, CN501, CN502, CN503, CN504)	1, 2
[4]	Cylinder Shield	3	2(S-3)	-
[5]	REC Arm Assembly	3	----------	-
[6]	Main CBA	4	*2(L-4)	-
[7]	Function CBA	4	*(L-3), Desolder	3
		↓ ①	↓ ② ↓ ③ ↓ ④	↓ ⑤

①: Identification (location) No. of parts in the figures

②: Name of the part

③: Figure Number for reference

④: Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
P=Spring, L=Locking Tab, S=Screw, CN=Connector
*=Unhook, Unlock, Release, Unplug, or Desolder
e.g. 2(S-2) = two Screws (S-2),
2(L-2) = two Locking Tabs (L-2)

⑤:Refer to "Reference Notes."

Reference Notes

CAUTION: Locking Tabs (L-1) and (L-2) are fragile. Be careful not to break them.

1. Remove six Screws (S-2) and the Spacer. Then slowly lift the Deck Assembly up. Lifting Deck Assembly disconnects five Connectors (CN251, CN501, CN502, CN503, CN504). (Fig. 3)
2. Before installing the Deck Assembly, be sure to place the pin of LD-SW on Main CBA as shown in Fig. 5. Then, install the Deck Assembly while aligning the hole of Cam Gear with the pin of LD-SW, the shaft of Cam Gear with the hole of LD-SW as shown in Fig. 5.
3. After removing the Main CBA, desolder from bottom of the Main CBA as shown in Fig. 4 to remove the Function CBA.

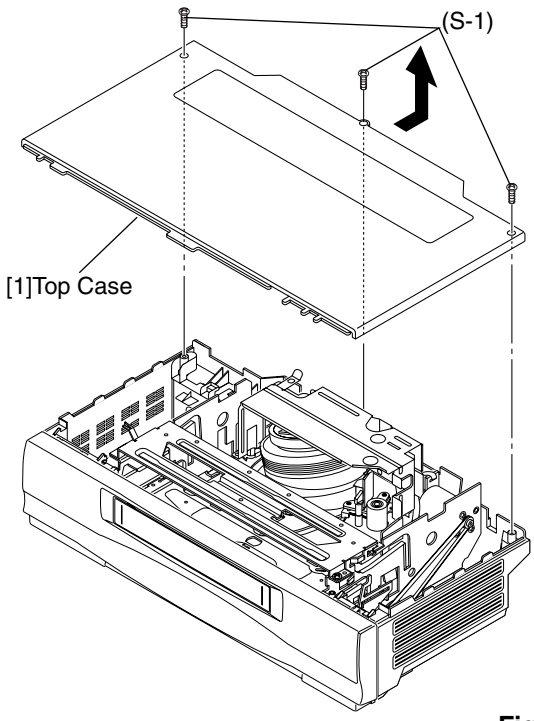


Fig. 1

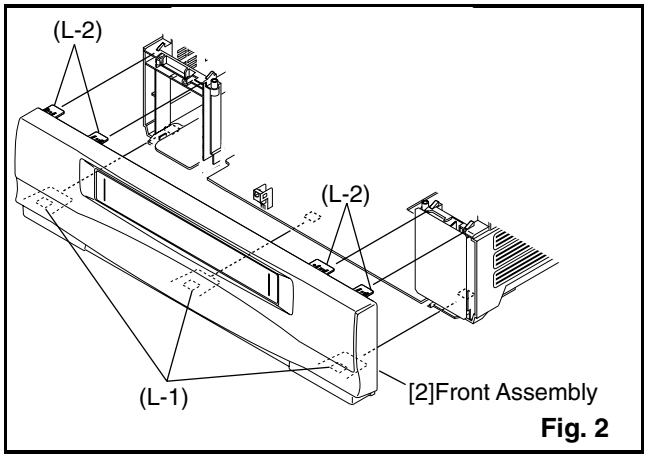


Fig. 2

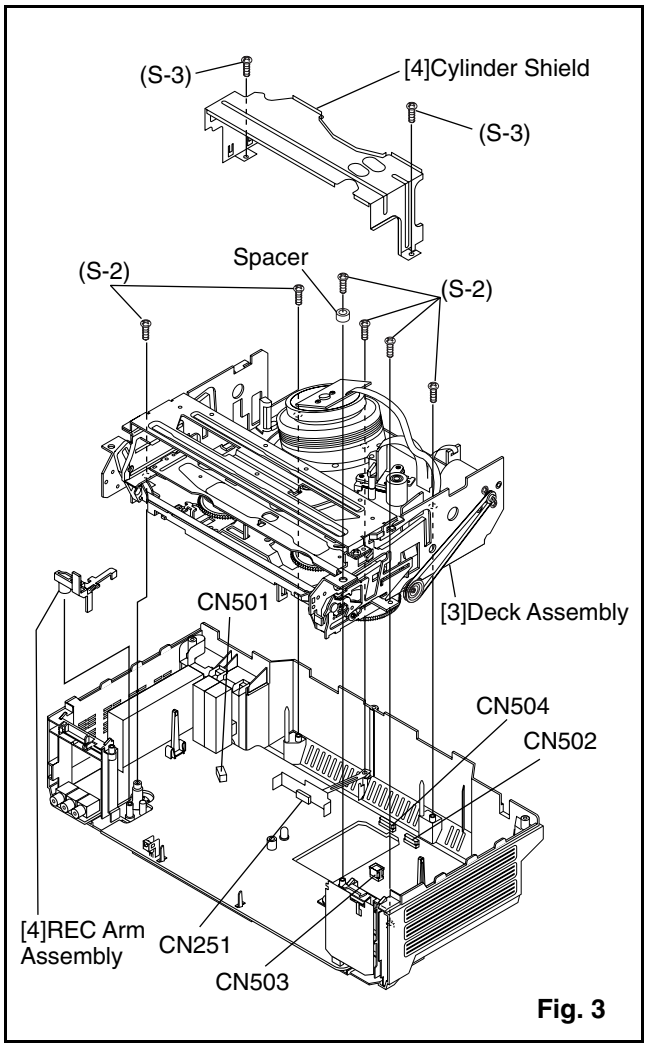


Fig. 3

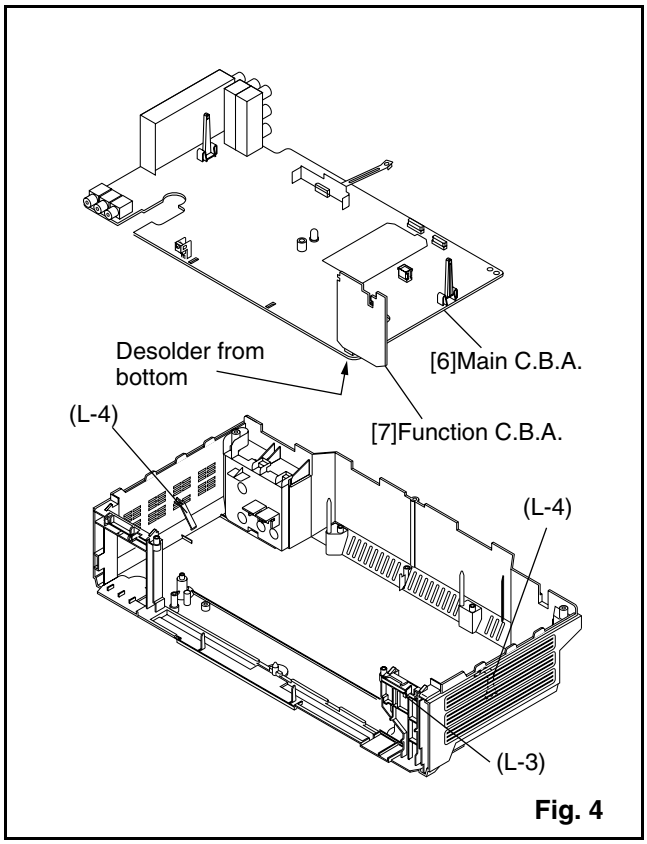


Fig. 4

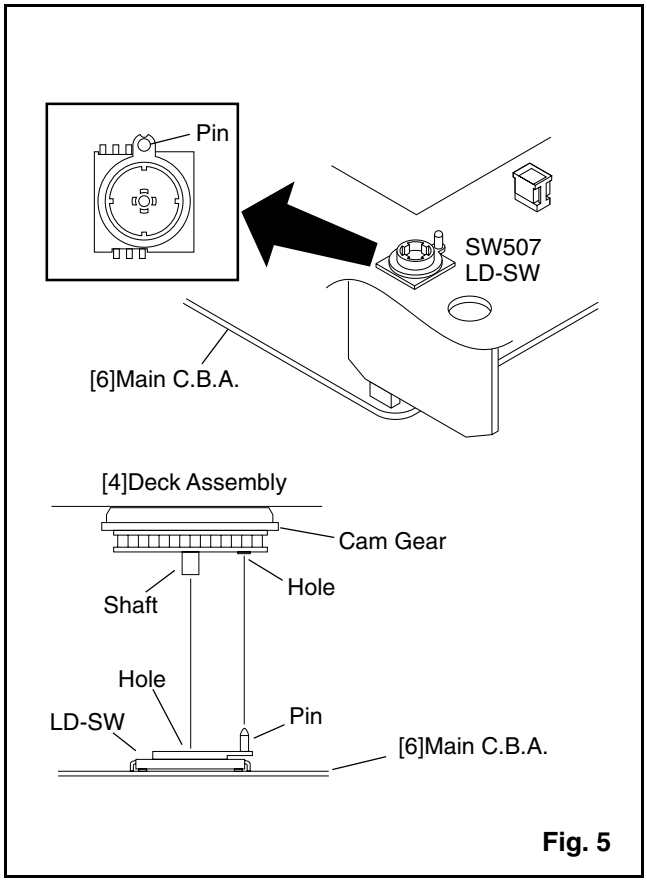


Fig. 5

ELECTRICAL ADJUSTMENT INSTRUCTIONS

General Note: "CBA" is an abbreviation for "Circuit Board Assembly."

NOTE:

1. Electrical adjustments are required after replacing circuit components and certain mechanical parts. It is important to do these adjustments only after all repairs and replacements have been completed. Also, do not attempt these adjustments unless the proper equipment is available.
2. To perform these alignment / confirmation procedures, make sure that the tracking control is set in the center position: Press either channel "▼" or "▲" button first, then the "PLAY" button (VCR's Front Panel only).

Test Equipment Required

1. Oscilloscope: Dual-trace with 10:1 probe, V-Range: 0.001~50V/Div., F-Range: DC~AC-20MHz
2. Alignment Tape (30HMP2-1)

Head Switching Position Adjustment

Purpose:

To determine the Head Switching point during playback.

Symptom of Misadjustment:

May cause Head Switching noise or vertical jitter in the picture.

Test Point	Adj. Point	Mode	Input
TP751(V-OUT) TP302(RF-SW) TP511(GND)	VR501 (Switching Point) (MAIN CBA)	PLAY (SP)	----
Tape	**Measurement Equipment**	**Spec.**	
30HMP2-1	Oscilloscope	6.5H±1H (412.7μs±60μs)	

Connections of Measurement Equipment

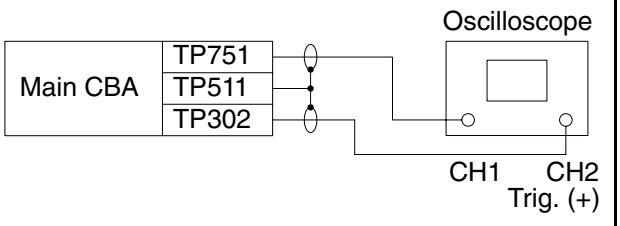
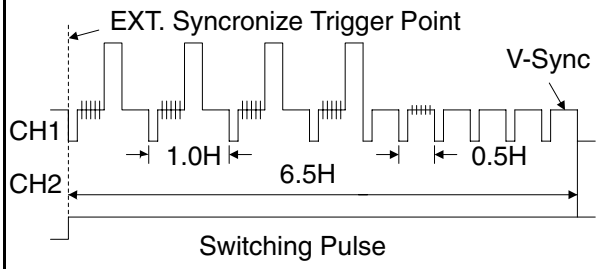


Figure 1

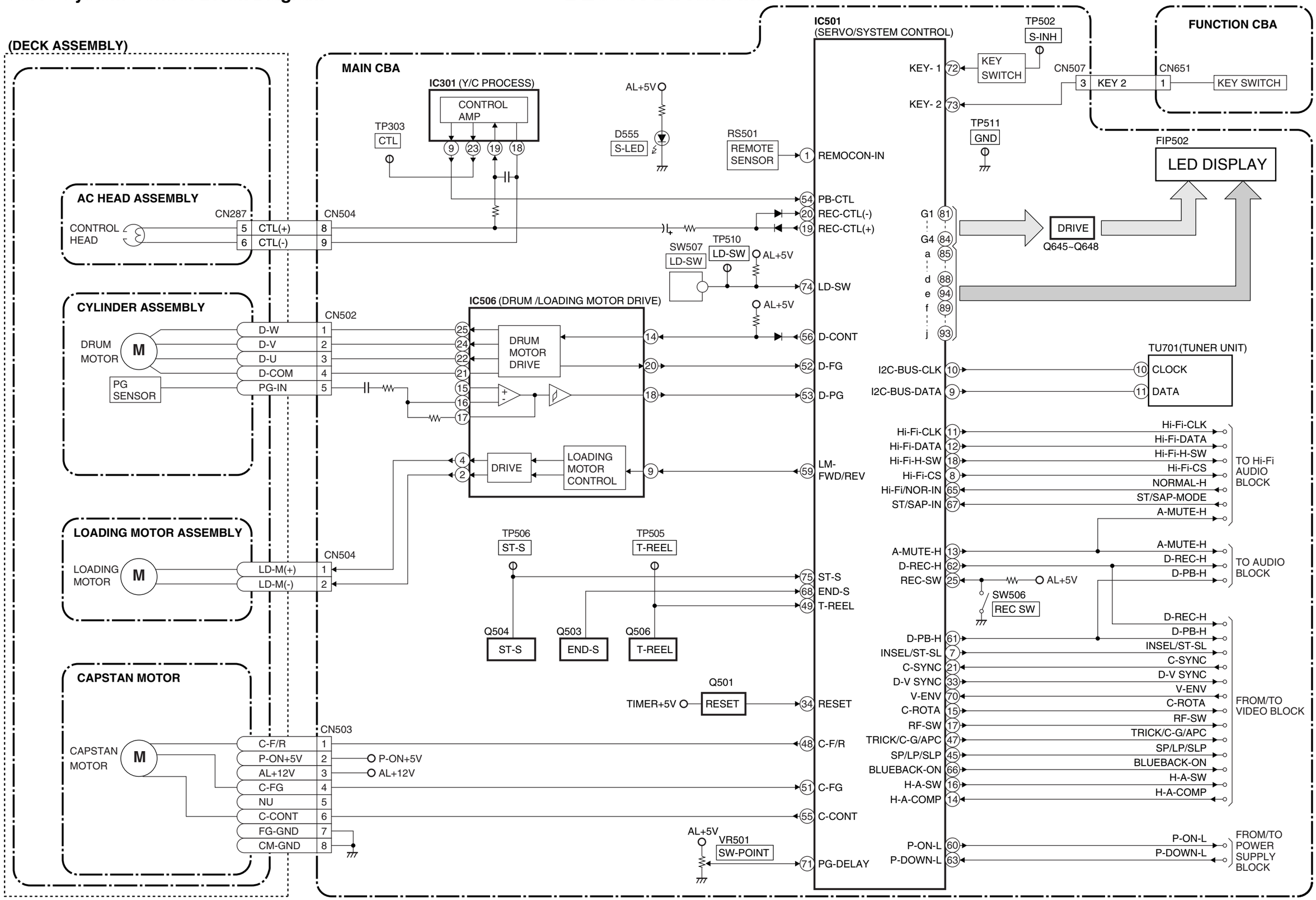


Reference Notes:

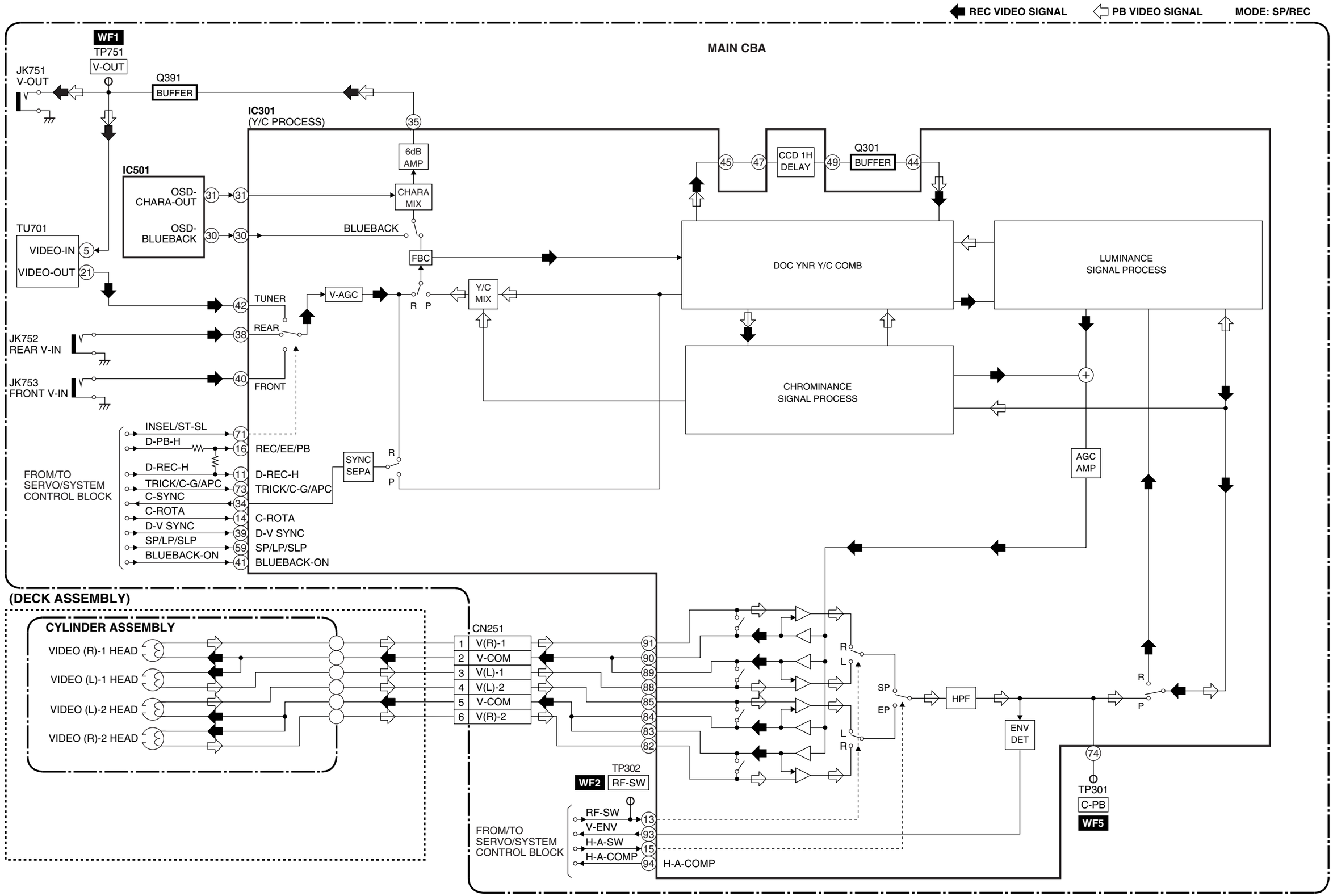
Play back the Alignment tape and adjust VR501 so that the V-sync front edge of the CH1 video output waveform is at the 6.5H(412.7μs) delayed position from the rising edge of the CH2 head switching pulse waveform.

BLOCK DIAGRAMS

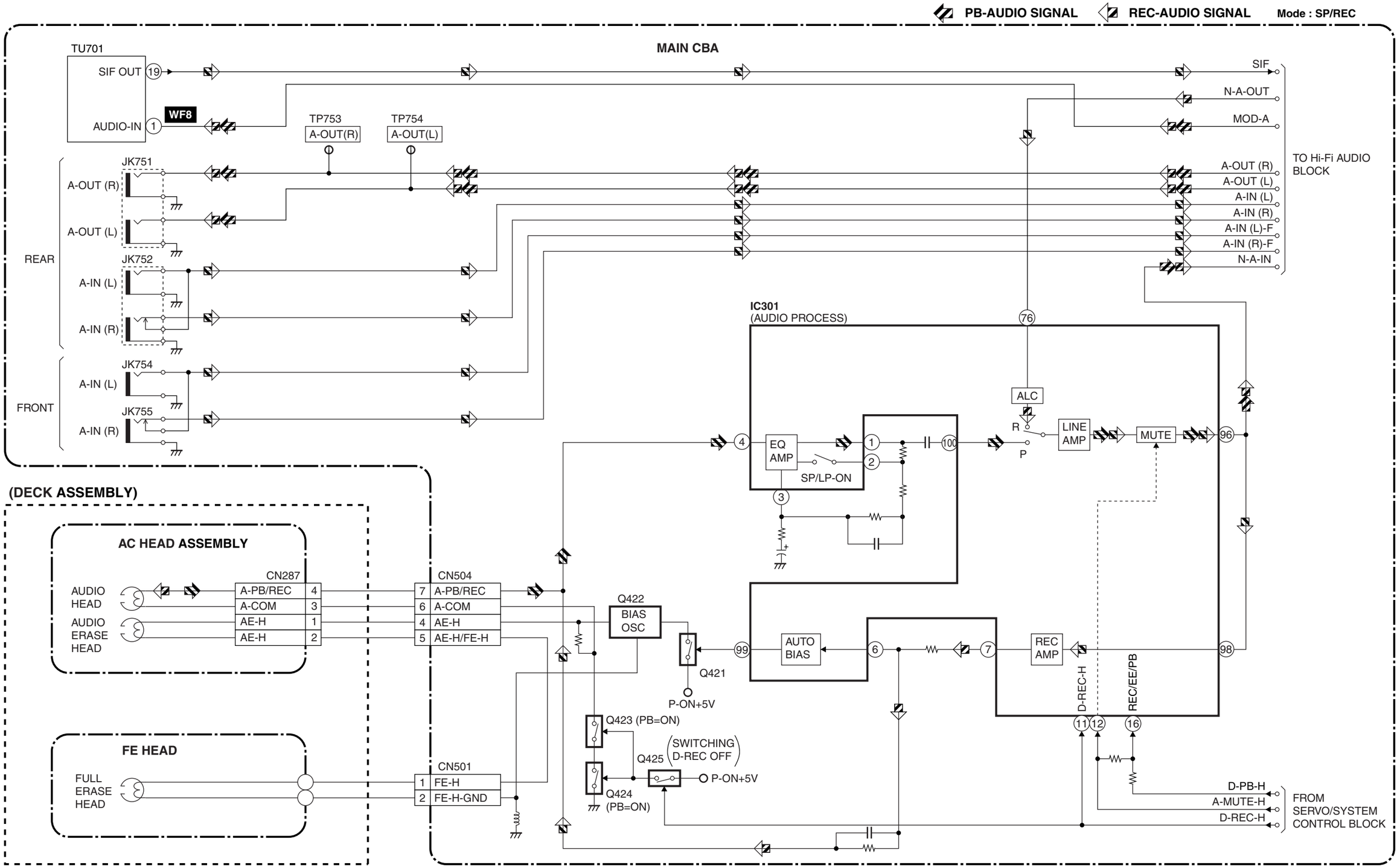
Servo/System Control Block Diagram



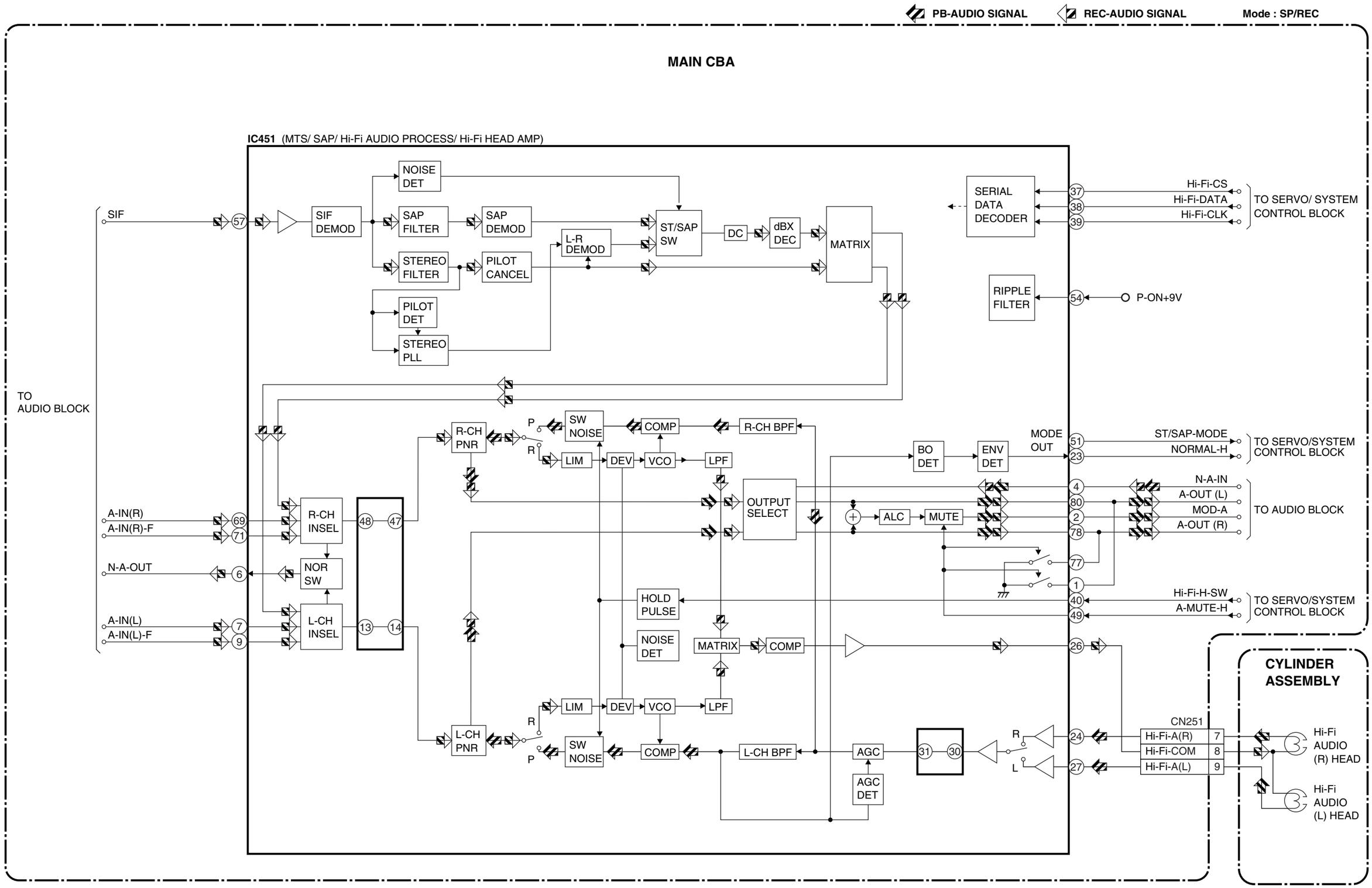
Video Block Diagram



Audio Block Diagram



Hi-Fi Audio Block Diagram

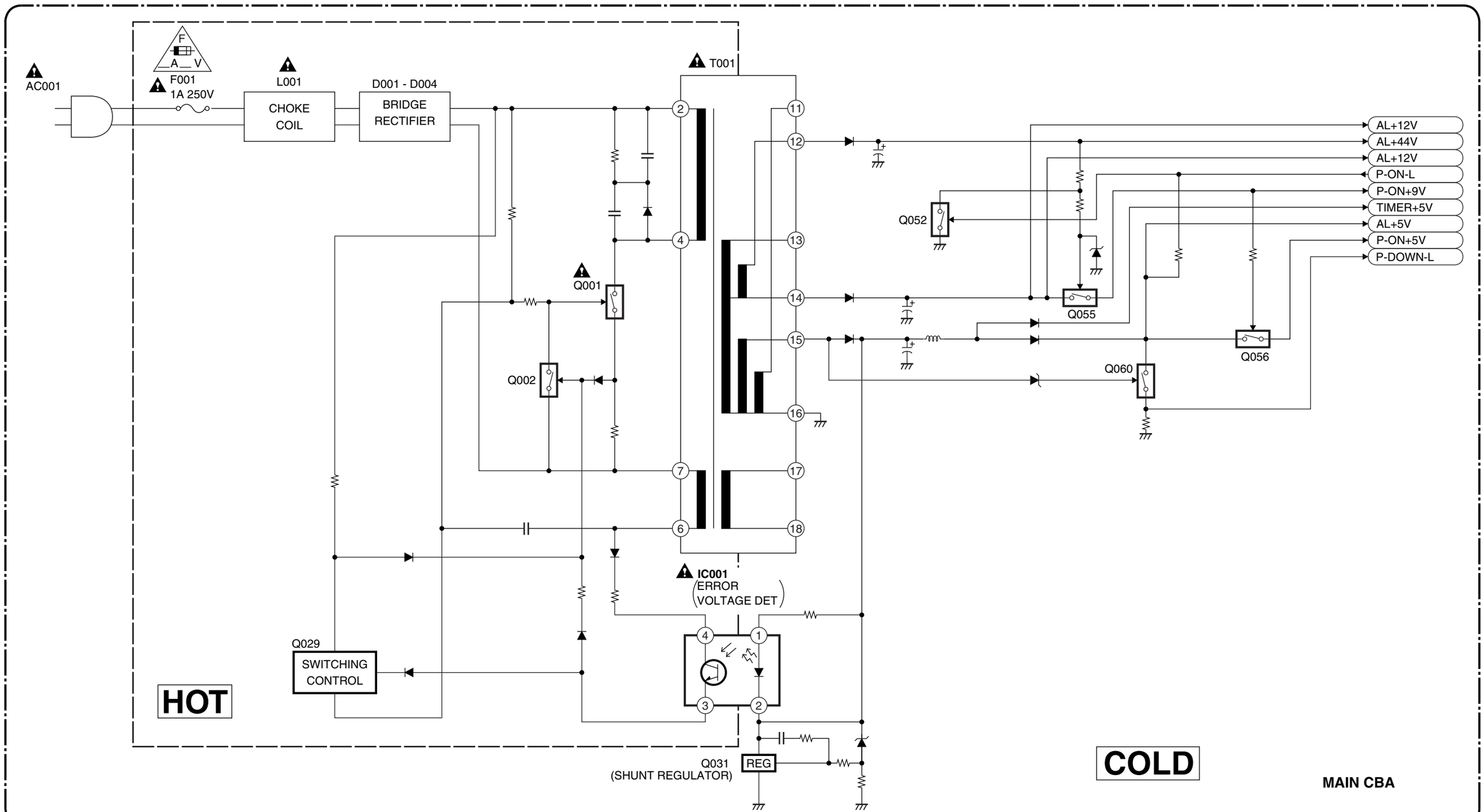


Power Supply Block Diagram

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE -REPLACE FUSE AS MARKED.
"This symbol means fast operating fuse."
"Ce symbole représente un fusible à fusion rapide."

CAUTION !
Fixed voltage power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

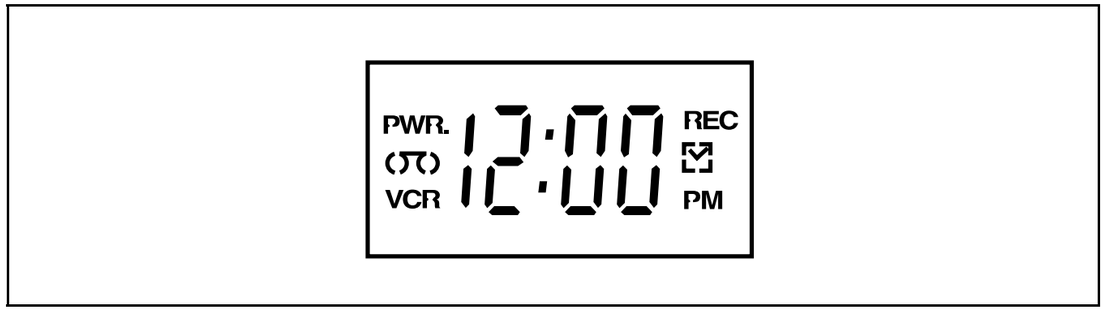


FUNCTION INDICATOR SYMBOL

Note:

The following symbols will appear on the indicator panel to indicate the current mode or operation of the VCR. On-Screen modes will also be momentarily displayed on the TV screen when you press the operation buttons.

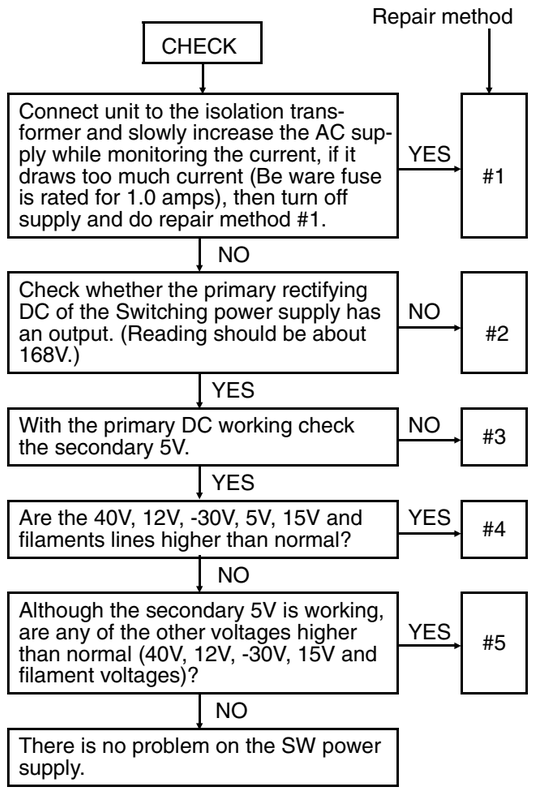
Display panel



LED MODE	INDICATOR ACTIVE	
CASSETTE "IN" CASSETTE "OUT"	" ⟲ " " ⟲ "	ON OFF
VCR/TV VCR MODE VCR/TV TV MODE	" VCR " " VCR "	ON OFF
CLOCK	" 88:88 " " PM "	ON ON/OFF
POWER ON	" PWR. "	ON
REC	" REC "	ON
REC PAUSE	" REC "	Blinks at 0.8Hz interval
T-REC, OTR	" ⊠ "	ON (T-REC OFF, T-REC incomplete Blinks at 0.8Hz interval)
When reel and capstan mechanism is not functioning correctly	" ⟲ " " 1 "	Blinks at 0.8Hz interval
When tape loading mechanism is not functioning correctly	" ⟲ " " 2 "	Blinks at 0.8Hz interval
When cassette loading mechanism is not functioning correctly	" ⟲ " " 3 "	Blinks at 0.8Hz interval
When the drum is not working properly	" ⟲ " " 4 "	Blinks at 0.8Hz interval
S-INH condition	All modes	Blinks at 0.8Hz interval

Power Supply Trouble Shooting Guide

It is highly recommended that a variable isolation transformer which can monitor current be used. (Alternatively a variable AC source which monitors current will do). Read directions below before power is added!


Repair method
CHECK
Connect unit to the isolation transformer and slowly increase the AC supply while monitoring the current, if it draws too much current (Be ware fuse is rated for 1.0 amps), then turn off supply and do repair method #1.
YES
#1
NO
Check whether the primary rectifying DC of the Switching power supply has an output. (Reading should be about 168V.)
NO
#2
YES
With the primary DC working check the secondary 5V.
NO
#3
YES
Are the 40V, 12V, -30V, 5V, 15V and filaments lines higher than normal?
YES
#4
NO
Although the secondary 5V is working, are any of the other voltages higher than normal (40V, 12V, -30V, 15V and filament voltages)?
YES
#5
NO
There is no problem on the SW power supply.

Repair method #1

(Power must be off)

Short circuit in the secondary side. check diode D013 and {(FIP display model only: D012, D014, D015, D016 and D017) or (LED display model only: D014, D015 and D016)}, switching FET (Q001), control transistor (Q002), diode (D006), and resistor (R014) replace as necessary.

Disconnect 40V diode (D013), 15V diode (D014), 12V diode (D015),
5V diode (D016) and {FIP display model only: -30V diode (D012) and filament voltage diode (D017)}Check the load continuity of 40V line, 15V line, 12V line, 5V line, -30V line and filament voltage line through a tester (resistance range).

If the tester indicates a lower resistance value around 0 ohm, the line is short-circuited.

Before repairing the switching power supply, find out the short-circuited area of such line and repair it.

If the tester does not indicate any low resistance value (around 0 ohm), no load is short-circuited and there is no problem.

2] Check for any defective parts while the secondary rectifying diodes are disconnected (D013, D014, D015, D016 and {FIP display model only: D012 and D017)} perform a diode check in both forward and reverse directions through a tester.

3] Remove the following components and check for defects: snubber diode (D051), switching FET (Q001), source resistor (R014), control transistor (Q002).

Repair method #2

Check the fuse 1.0A (F001), primary rectifying diodes (D001-D004) as possible problems. Remove the above mentioned parts and check them. The circuit which turns on switching FET (Q001) may be regarded as a possible cause, even if the load at the secondary side is shorted, it can't be detected because switching FET (Q001) isn't operating. Perform check according to the step 1 and 2 of repair method #1 and check the following parts:

(Remove the part from PCB)

Switching FET (Q001), source resistor (R014), gate resistor (R008) and start resistor (R004 and R005).

Repair method #3

A circuit to turn on switching FET (Q001) may not work and this may be regarded as a cause of trouble. Even if the load at the secondary side is short-circuited, it cannot be detected because switching FET (Q001) does not turn on. Therefore, perform check according to the steps 1] and 2] of the repair method #1 and execute the under-mentioned parts breakage check.

(Remove the part from PCB.)

switching FET (Q001), source resistor (R014), control transistor (Q002), gate resistor (R008) and start resistor (R004 and R005).

Repair method #4

The feedback circuit which is monitored by the output of voltage may not work and this may be regarded as a possible cause, remove control transistor Q002 and check for defects. More over, a photo coupler (IC001) and transistor (Q031) may be defective, replace any defective parts with factory originals.

Repair method #5

If the output voltage of the secondary side is slightly high, the line load may be in the "OPEN" state and this may be regarded as a cause of trouble. If there is no output voltage on the secondary side, the rectifying diodes (D013), (D014), (D015) and {FIP display model only only: (D012) and (D017)} may be defective.

SCHEMATIC DIAGRAMS / CBA'S AND TEST POINTS

Standard Notes

Warning

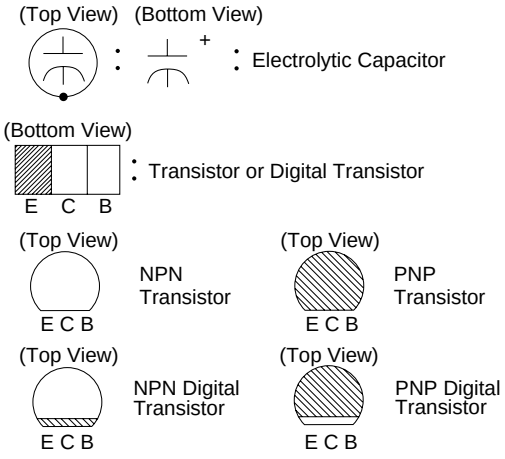
Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the mark " ⚠ " in the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

Capacitor Temperature Markings

Mark	Capacity change rate	Standard temperature	Temperature range
(B)	±10%	20℃	-25~+85℃
(F)	+30 -80%	20℃	-25~+85℃
(SR)	±15%	20℃	-25~+85℃
(Z)	+30 -80%	20℃	-10~+70℃

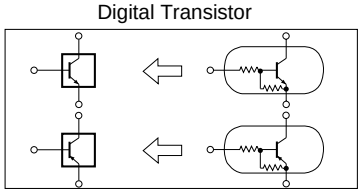
Capacitors and transistors are represented by the following symbols.

CBA Symbols



Schematic Diagram Symbols

Digital Transistor



Note:

1. Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
2. All voltages are DC voltages unless otherwise specified.

Values in schematic diagrams

The values, dielectric strength (power capacitance) and tolerances of the resistors (excluding variable resistors) and capacitors are indicated in the schematic diagrams using abbreviations.

[Resistors]

Item	Indication
Value	No indication.....Ω K.....kΩ M.....MΩ
Power capacitance	No indication.....1/4W,1/6W All capacitances other than the above are indicated in schematic diagrams.

[Capacitors]

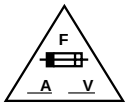
Item	Indication
Value	No indication.....μF P.....pF
Dielectric strength	No indication.....50V All dielectric strengths other than 50V are indicated in schematic diagrams.

[Coils]

Item	Indication
Value	μ.....μH m.....mH

LIST OF CAUTION, NOTES, AND SYMBOLS USED IN THE SCHEMATIC DIAGRAMS ON THE FOLLOWING PAGES:

1. **CAUTION:**



FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.

2. **CAUTION:**

This symbol means fast operating fuse.
Ce symbole reprèsente un fusible à fusion rapide.

Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit.
If Main Fuse (F001) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

3. **Note:**

(1) Do not use the part number shown on the drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since the drawings were prepared.

(2) To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list section of the service manual.

4. Wire Connectors

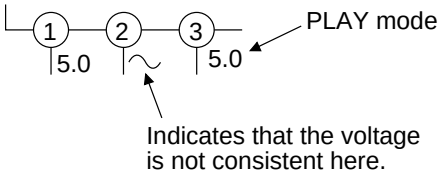
(1) Prefix symbol "CN" means "connector" (can disconnect and reconnect).

(2) Prefix symbol "CL" means "wire-solder holes of the PCB" (wire is soldered directly).

5. Note: Mark "•" is a leadless (chip) component.

6. Mode: SP

7. Voltage indications for PLAY mode on the schematics are as shown below:



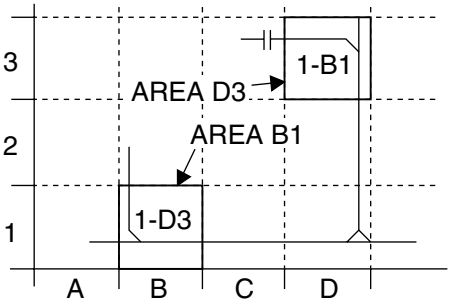
Unit: Volts

8. How to read converged lines

1-D3
Distinction Area
Line Number
(1 to 3 digits)

Examples:

1. "1-D3" means that line number "1" goes to area "D3".
2. "1-B1" means that line number "1" goes to area "B1".



9. Test Point Information

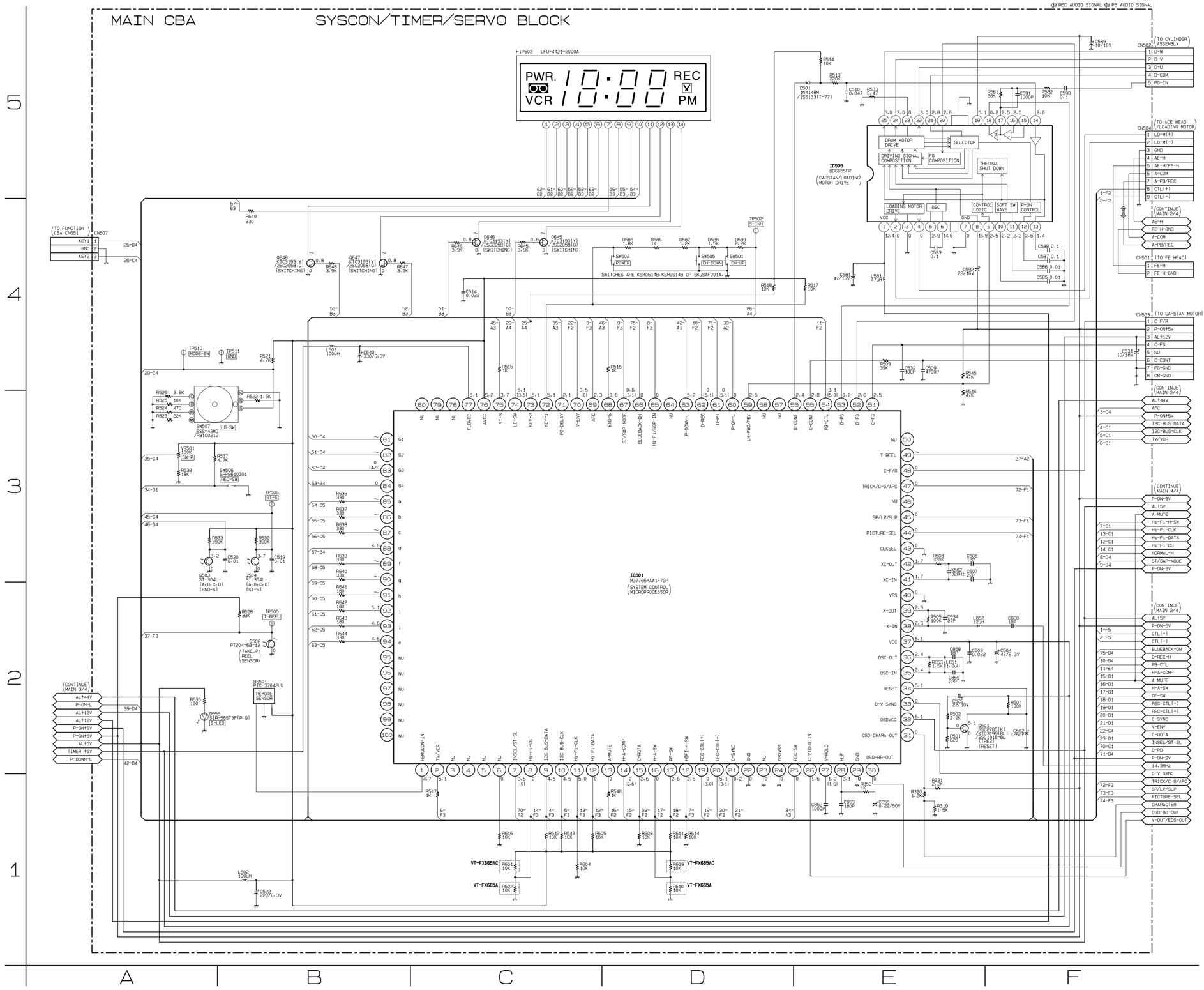
: Indicates a test point with a jumper wire across a hole in the PCB.

: Used to indicate a test point with a component lead on foil side.

: Used to indicate a test point with no test pin.

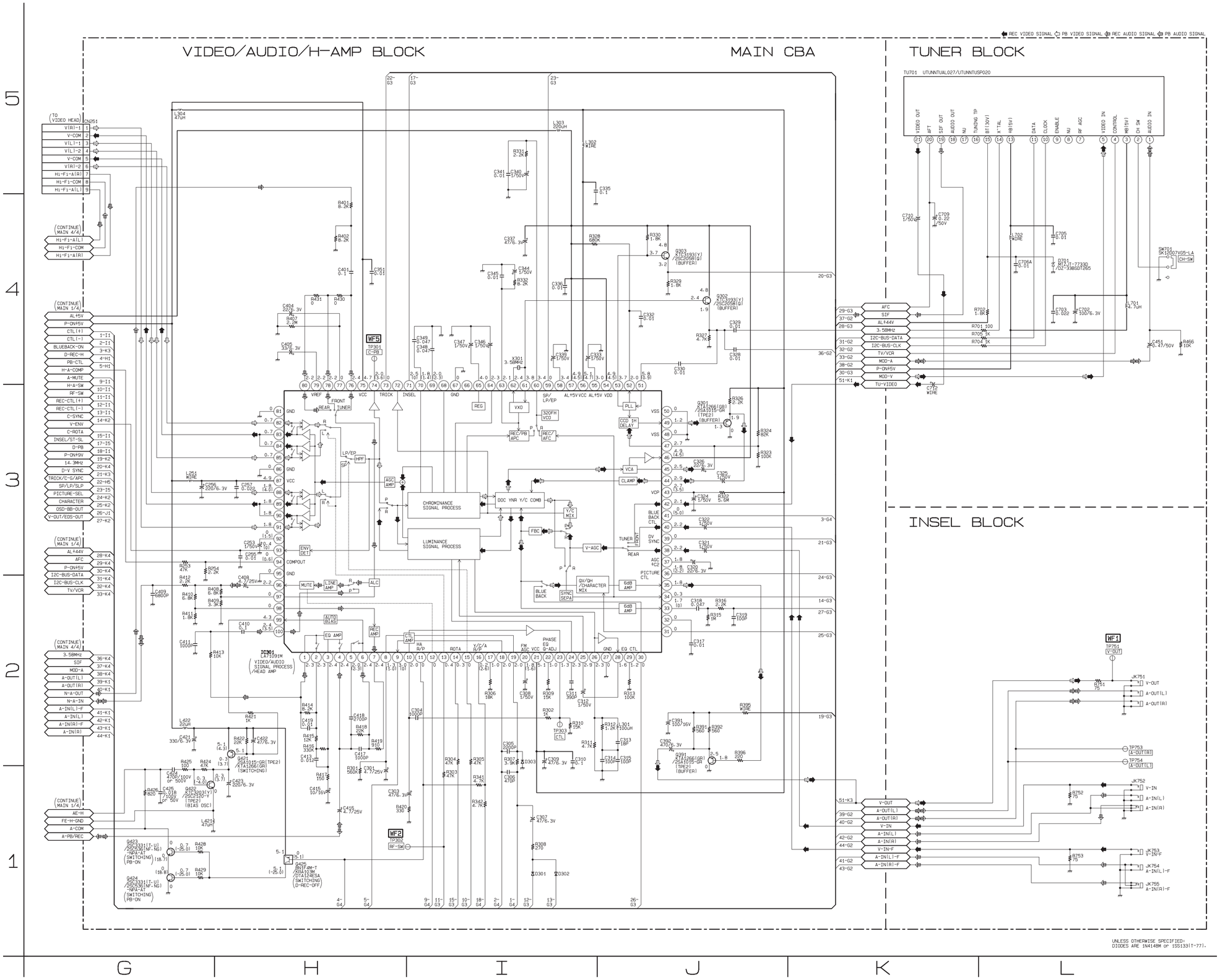
: Used to indicate a test point with a test pin.

Main 1/4 Schematic Diagram



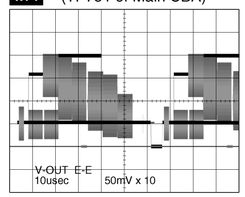
1-9-3 1-9-4 1-9-5

Main 2/4 Schematic Diagram

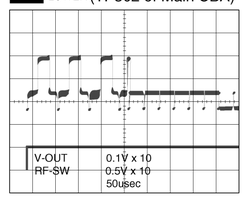


WAVEFORMS

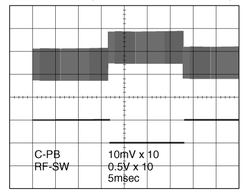
WF1 (TP751 of Main CBA)



WF1 UPPER (TP751 of Main CBA)
WF2 LOWER (TP302 of Main CBA)



WF5 UPPER (TP301 of Main CBA)
WF2 LOWER (TP302 of Main CBA)

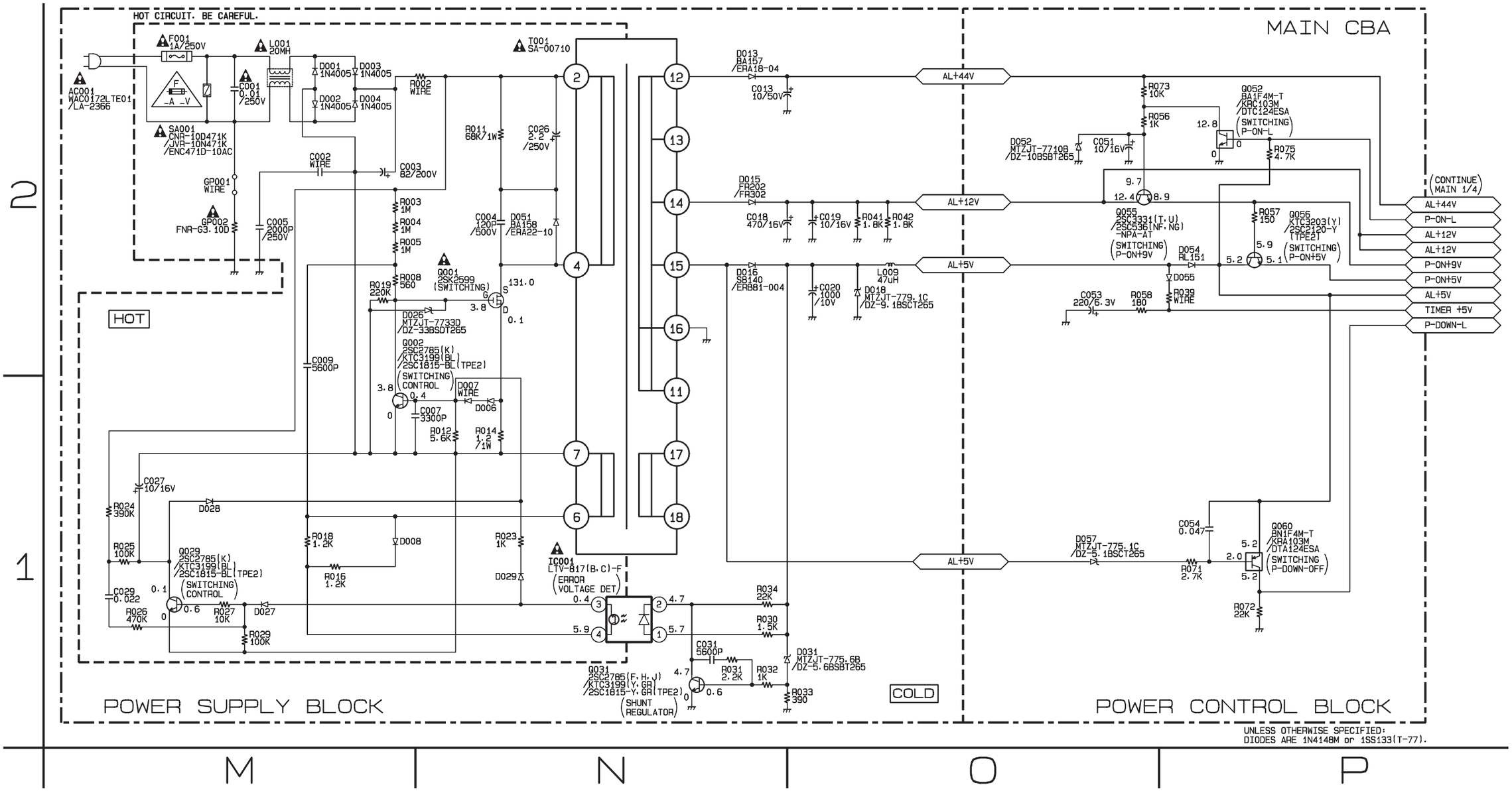


Main 3/4 Schematic Diagram

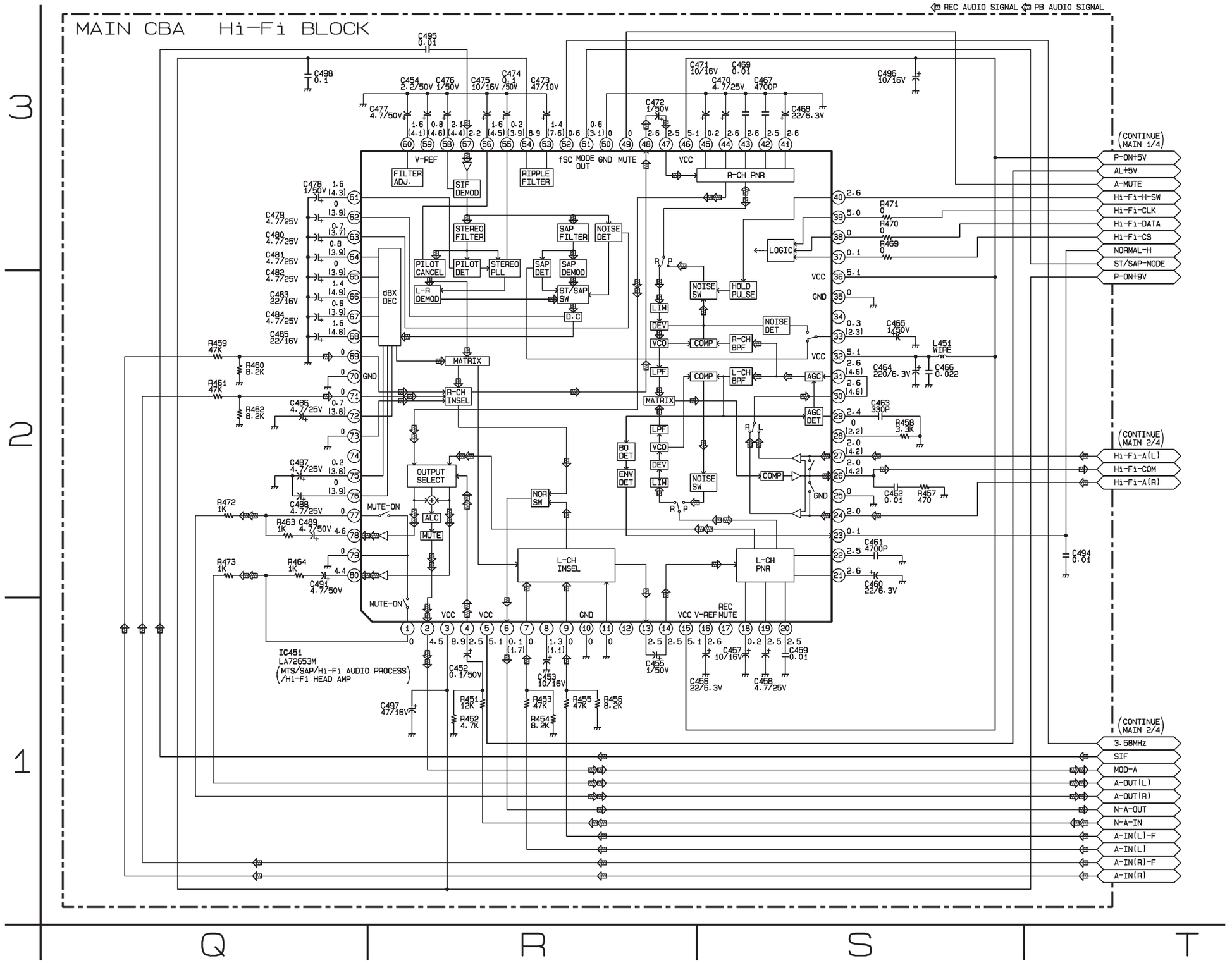
CAUTION !
Fixed voltage power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

CAUTION
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.
RISK OF FIRE-REPLACE FUSE AS MARKED.
"This symbol means fast operating fuse."
"Ce symbole reprèsente un fusible à fusion rapide."

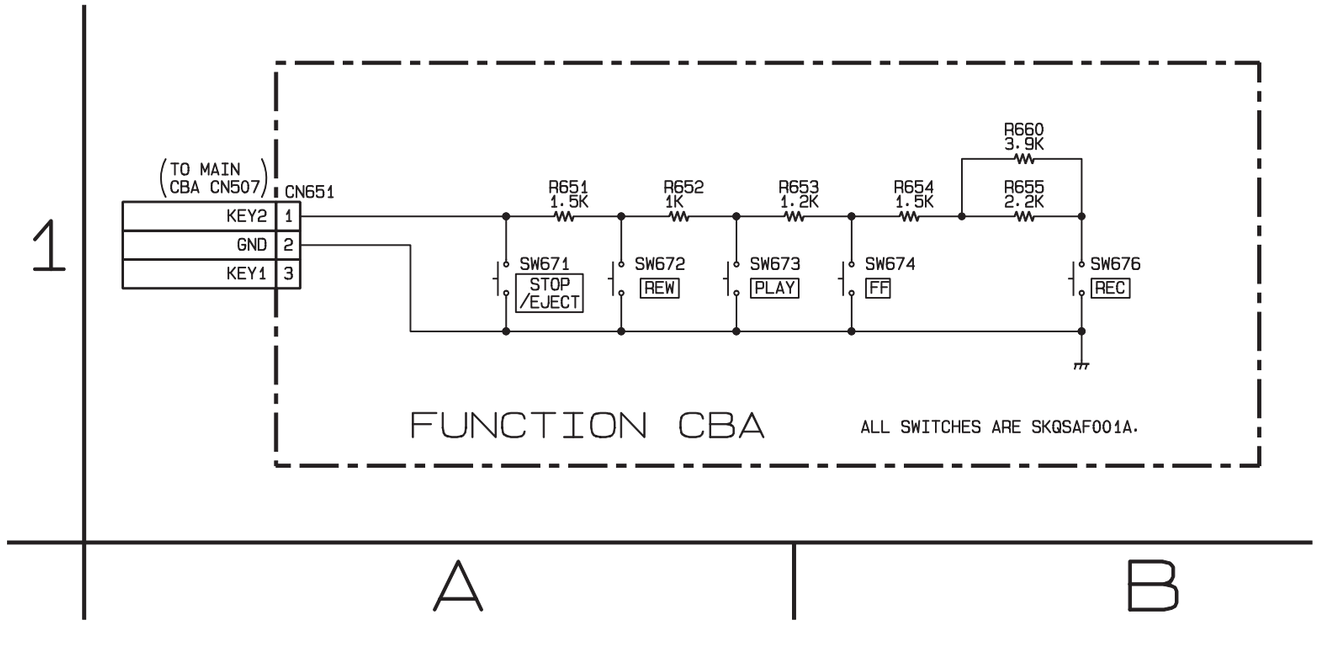
NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.



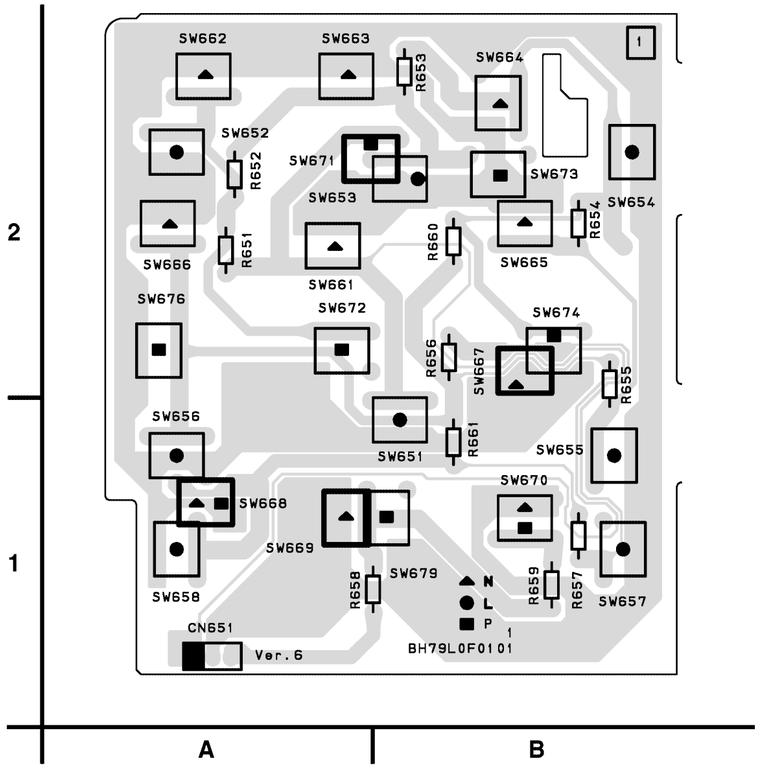
Main 4/4 Schematic Diagram



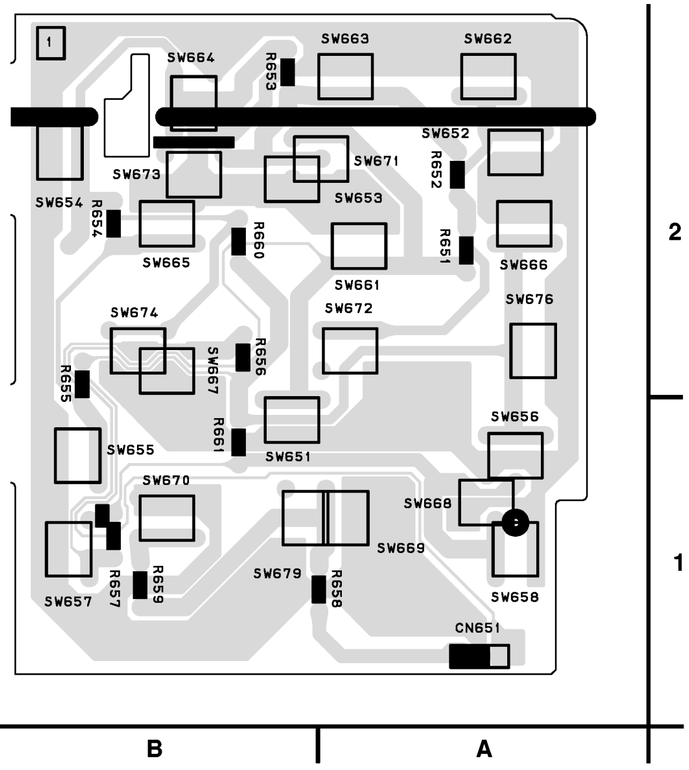
Function Schematic Diagram



Function CBA Top View



Function CBA Bottom View



Main CBA Top View

CAUTION !
Fixed voltage power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
Otherwise it may cause some components in the power supply circuit to fail.

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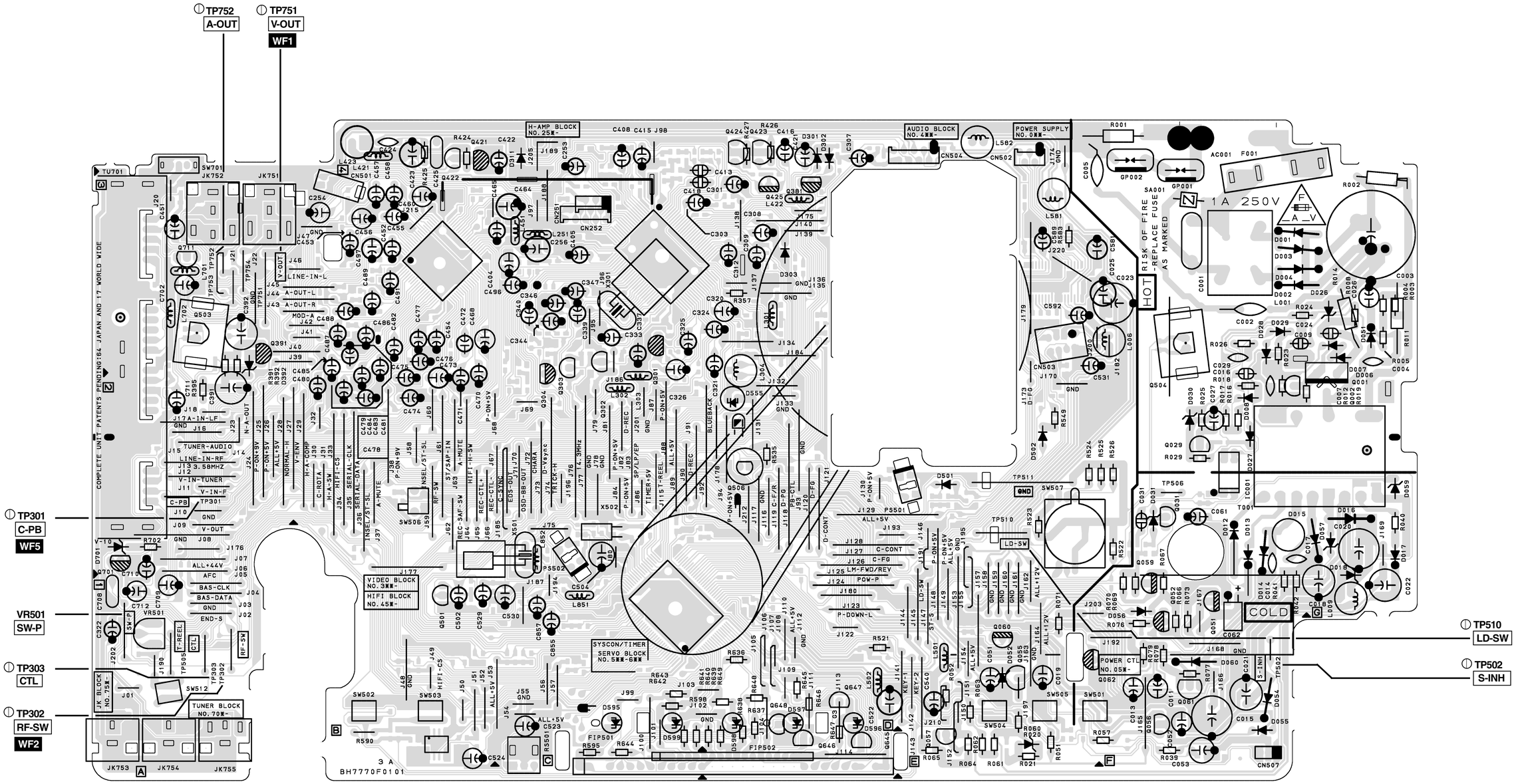
"This symbol means fast operating fuse."
"Ce symbole reprèsente un fusible à fusion rapide."

BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT , AN ISOLATION TRANSFORMER MUST BE USED. ALSO , IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY , WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT , A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.

NOTE :
The voltage for parts in hot circuit is measured using hot GND as a common terminal.



Main CBA Bottom View

CAUTION !
Fixed voltage power supply circuit is used in this unit.
If Main Fuse (F001) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.
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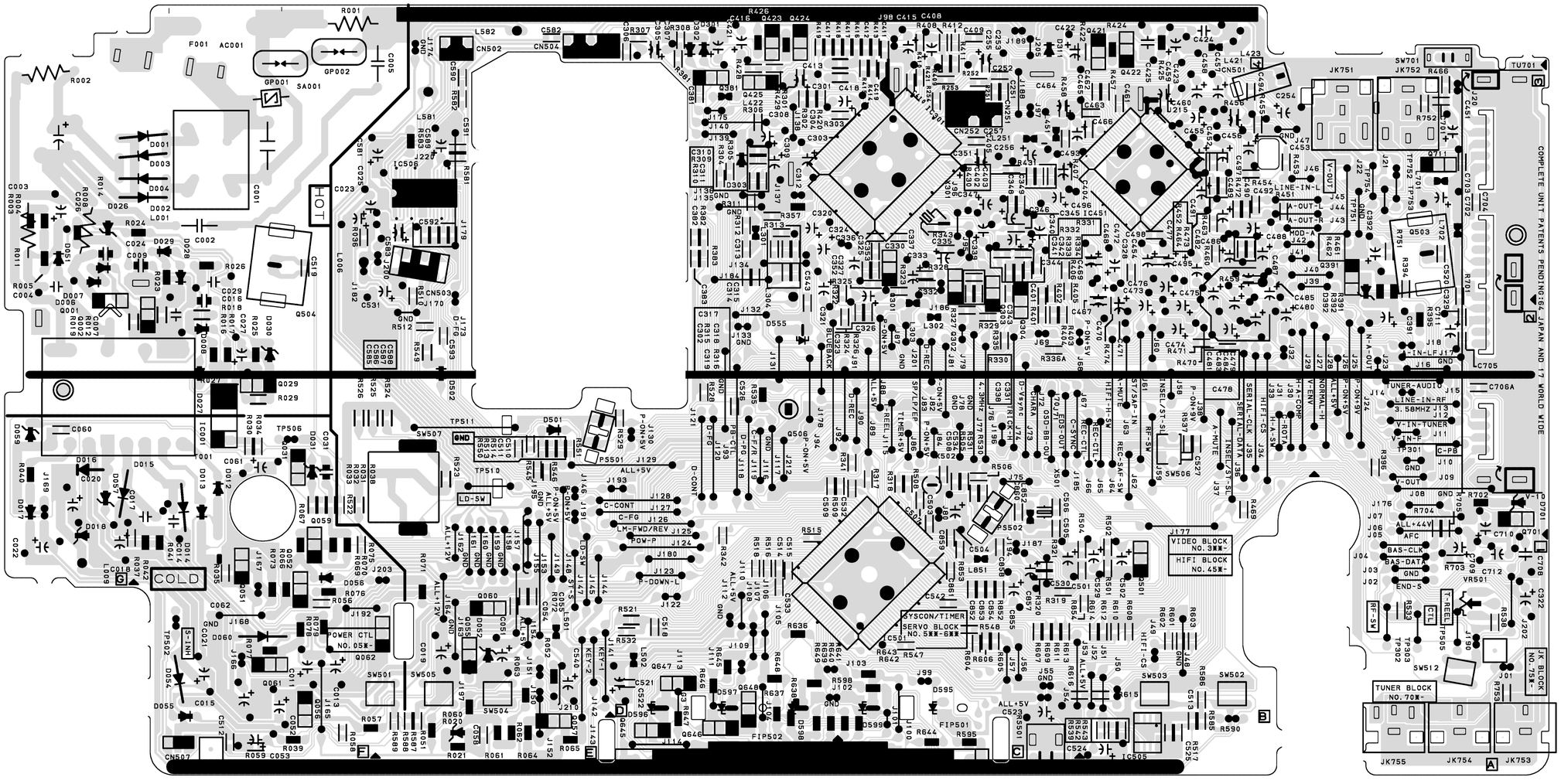
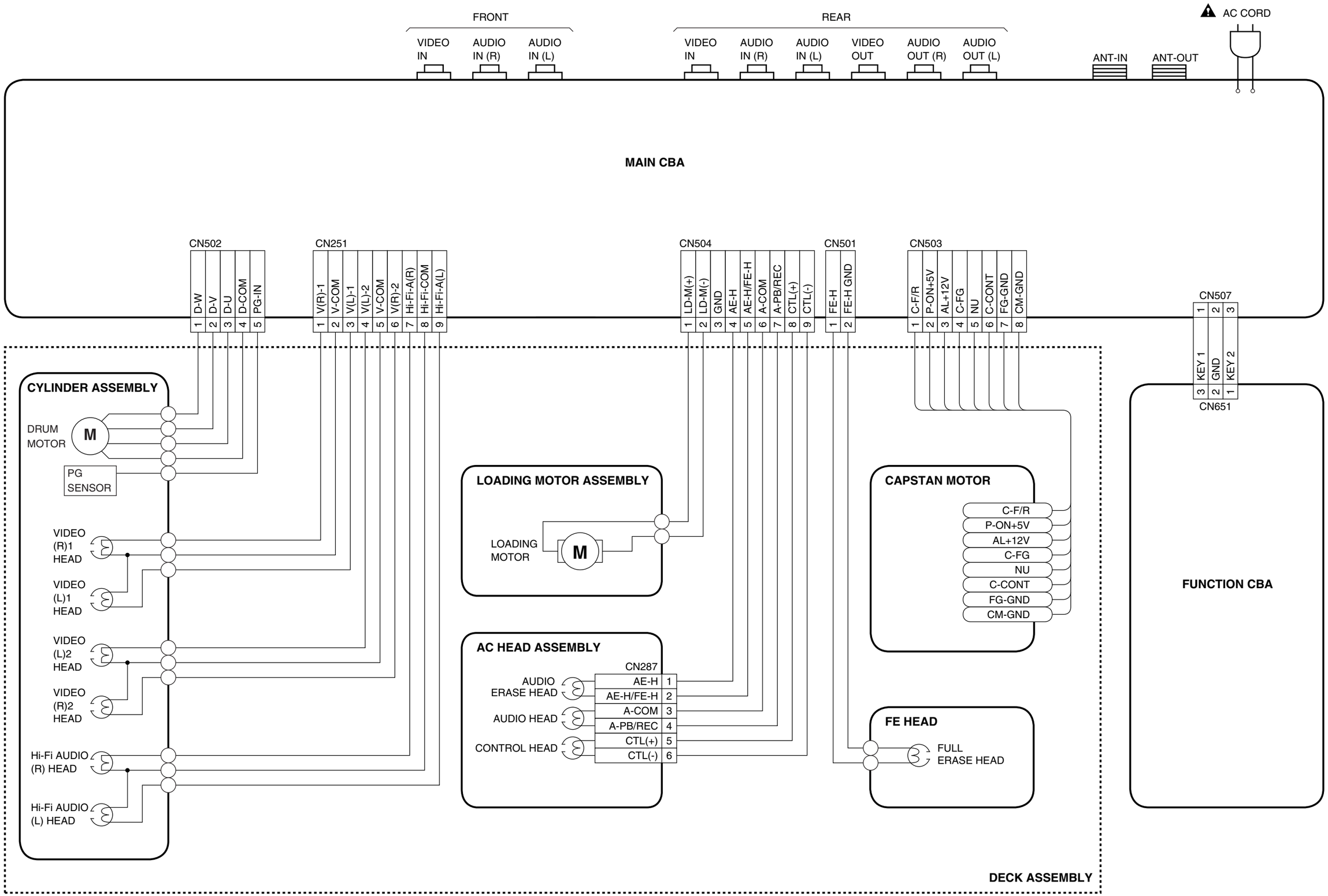


WIRING DIAGRAM



SYSTEM CONTROL TIMING CHARTS

Mode SW : LD-SW

LD-SW Position detection A/D Input voltage Limit (Calculated voltage)	Symbol
3.76V~4.50V (4.12V)	EJ
4.51V~5.00V (5.00V)	CL
0.00V~0.25V (0.00V)	SB
1.06V~1.50V (1.21V)	TL
0.66V~1.05V (0.91V)	FB
1.99V~2.60V (2.17V)	SF
1.51V~1.98V (1.80V)	AU
3.20V~3.75V (3.40V)	AL
0.26V~0.65V (0.44V)	SS
4.51V~5.00V (5.00V)	GC
2.61V~3.19V (2.97V)	RS

Note:

EJ → RS : Loading FWD (LM-FWD "H", LM-REV "L")

RS → EJ : Loading REV (LM-FWD "L", LM-REV "H")

Stop (A) = Loading

Stop (B) = Unloading

Note :

Symbol	Loading Status
EJ	Eject
CL	Eject ~ REW Reel
SB	REW Reel ~ Stop(B)
TL	Stop(B) ~ Brake Cancel
FB	Brake Cancel
SF	~ Stop(A)
AU	Stop(A) ~ Play / REC
AL	Play / REC ~ Still / Slow
SS	Still / Slow ~ Capstan Reversal
GC	Capstan Reversal ~ RS (REW Search)
RS	RS (REW Search)

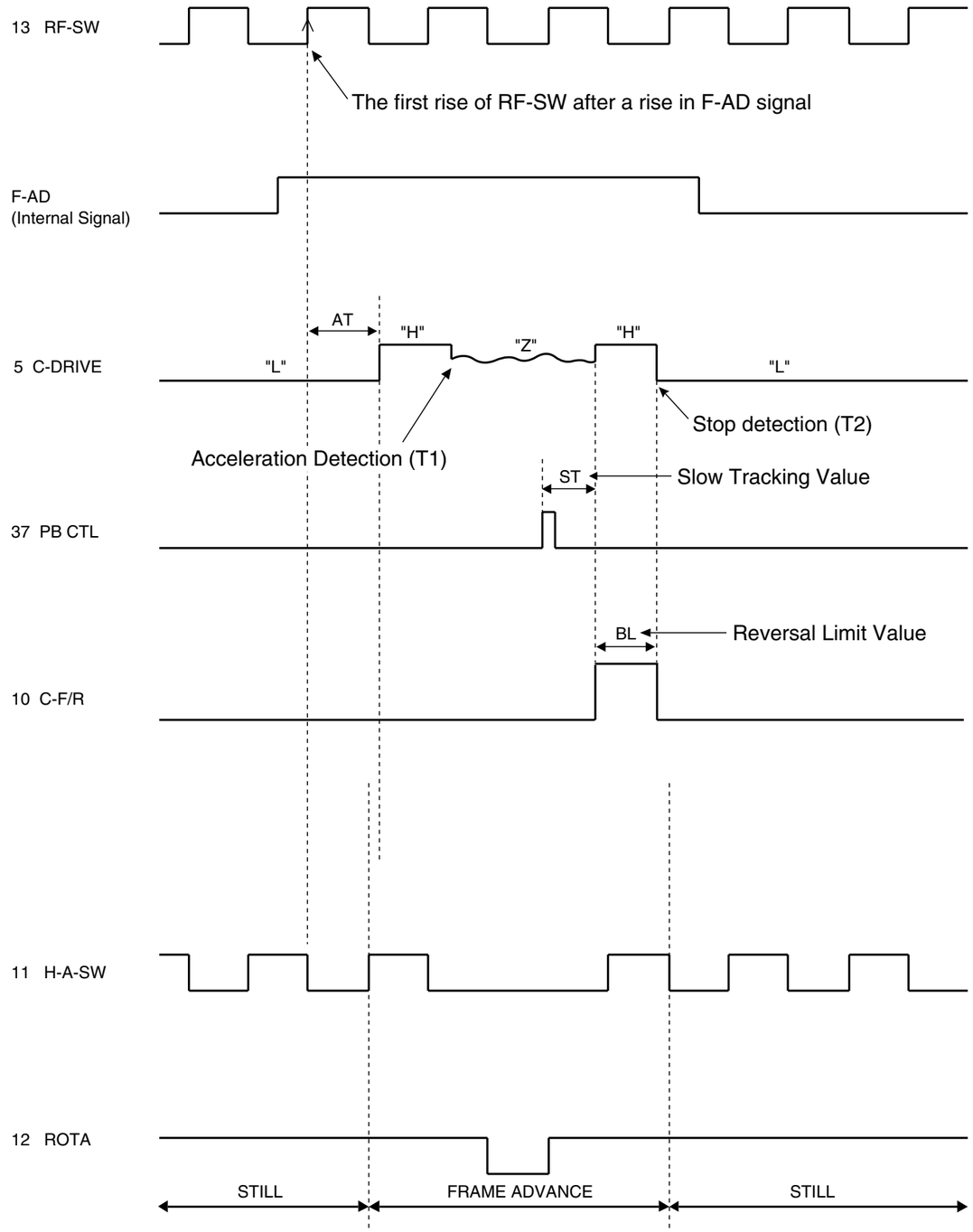


Fig.1

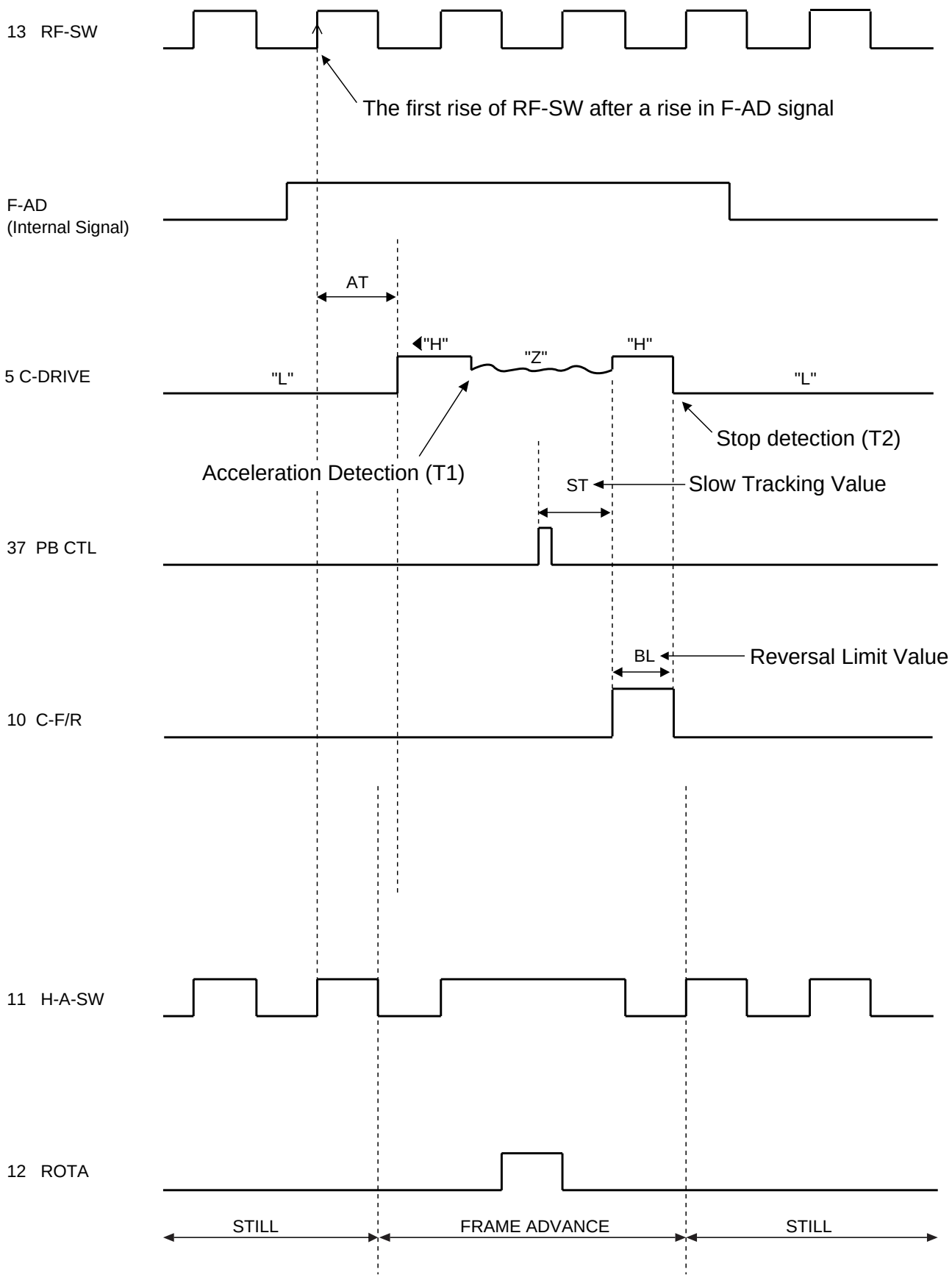

13 RF-SW
The first rise of RF-SW after a rise in F-AD signal
F-AD
(Internal Signal)
AT
5 C-DRIVE
"H"
"Z"
"H"
"L"
"L"
Stop detection (T2)
Acceleration Detection (T1)
ST
Slow Tracking Value
37 PB CTL
BL
Reversal Limit Value
10 C-F/R
11 H-A-SW
12 ROTA
STILL
FRAME ADVANCE
STILL

Fig.2

1. EJECT (POWER OFF) -> CASSETTE IN (POWER ON) -> STOP(B) -> STOP(A) -> PLAY -> RS -> FS -> PLAY -> STILL -> PLAY -> STOP(A)

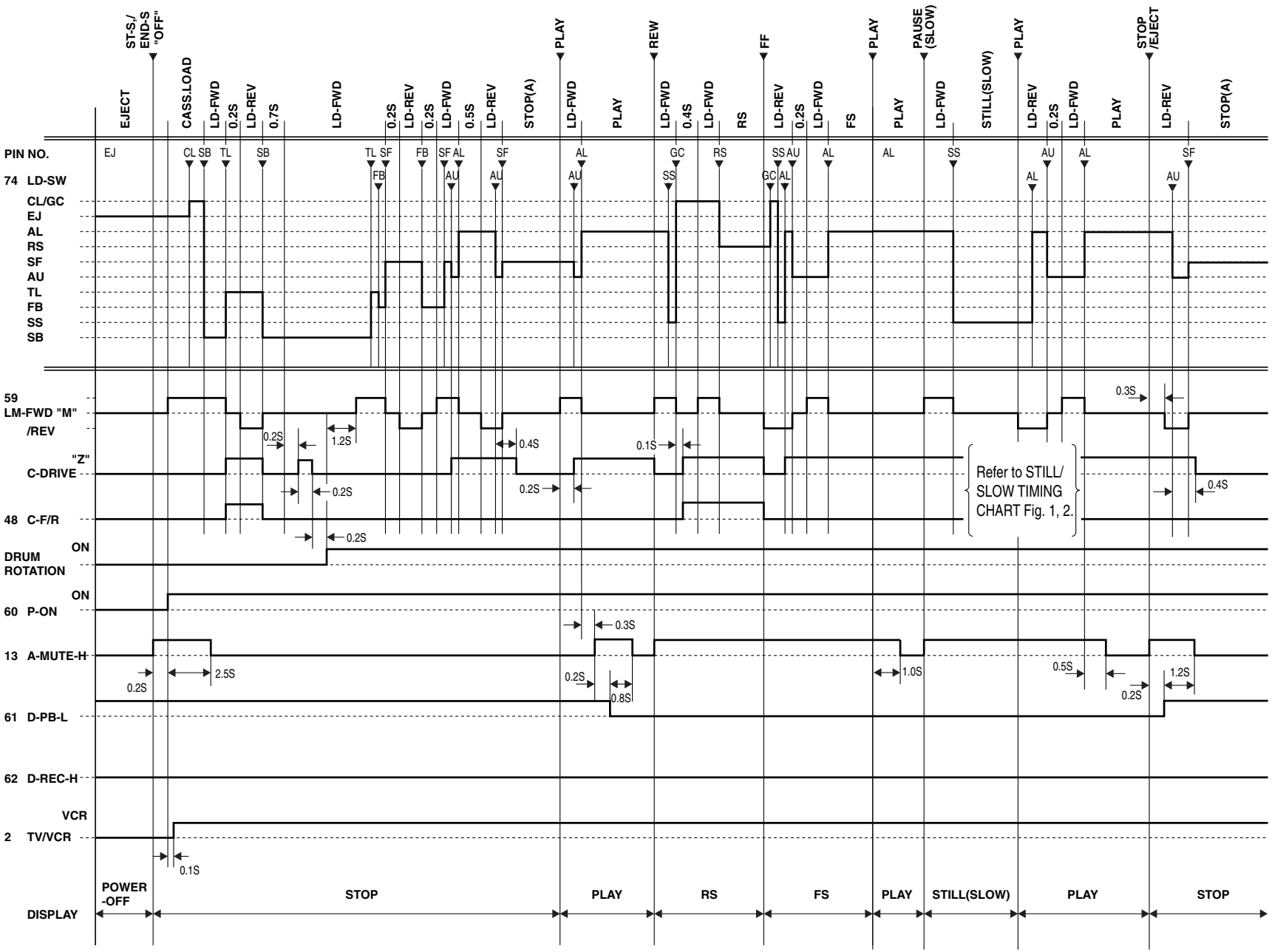


Fig.3

2. STOP(A) -> FF -> STOP(A) -> REW -> STOP(A) -> REC -> PAUSE -> PAUSE or REC -> STOP(A) -> EJECT

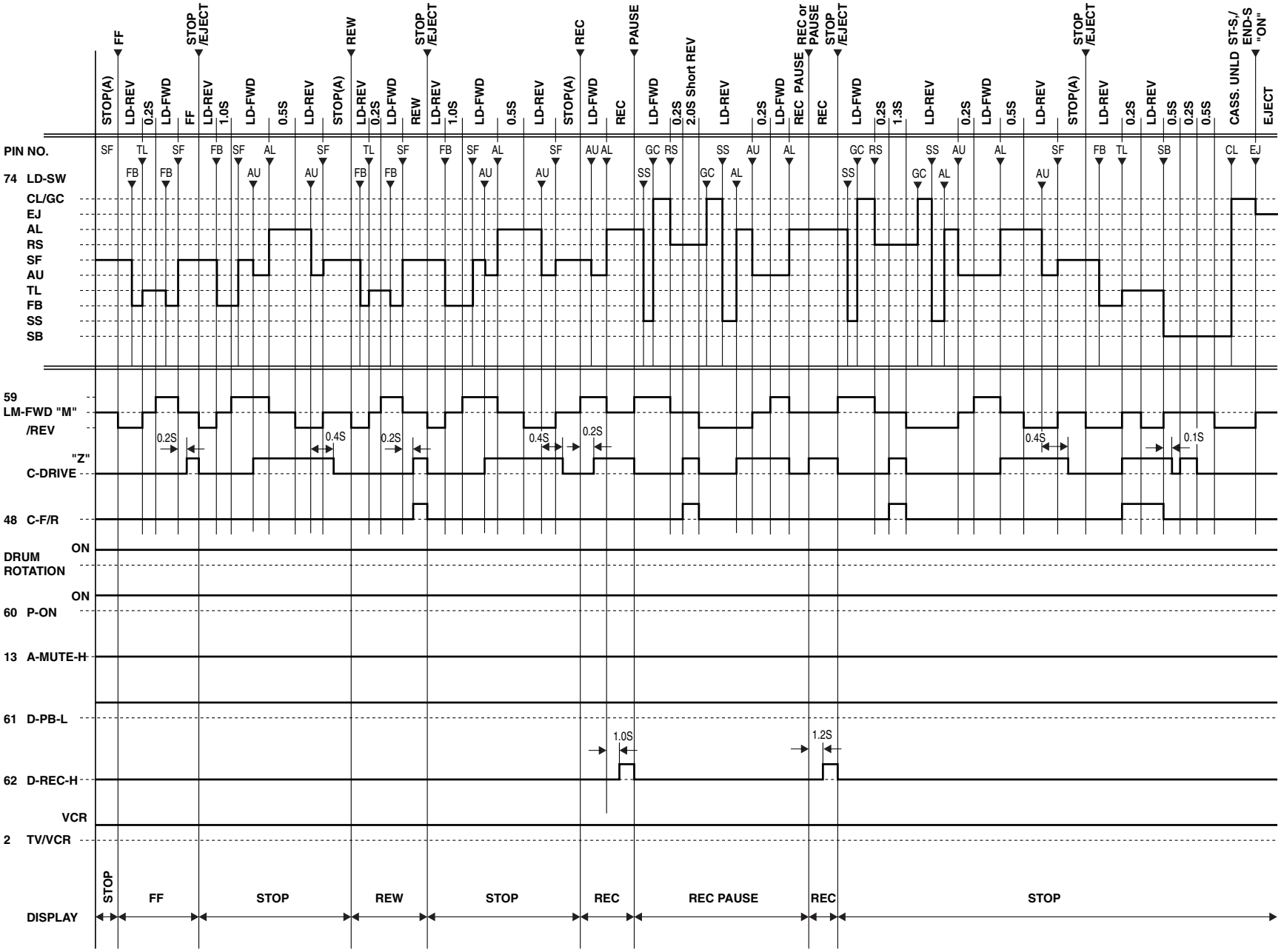


Fig.4

1-11-5

IC PIN FUNCTION

IC501 (SERVO / SYSTEM CONTROL IC)

"H" ≥ 4.5V, "L" ≤ 1.0V

Pin No.	IN/ OUT	Signal Name	Function	Active Level
1	IN	REMO CON-IN	Remote Control Sensor	L
2	OUT	TV/VCR	RF Conv. ON/OFF Signal (TV="L"/ VCR="H")	H/L
3	–	N.U.	Not Used	–
4	–	N.U.	Not Used	–
5	–	N.U.	Not Used	–
6	–	N.U.	Not Used	–
7	OUT	INSEL/ ST-SL	Input Selector Control Signal (EE/Rec)/ Still/Slow (Playback)	H/Hi-z /L
8	OUT	HiFi-CS	HiFi IC Chip Select	H
9	IN/ OUT	I^2C BUS-DATA	I^2C BUS Data Input/Output	H/L
10	OUT	I^2C BUS-CLK	I^2C BUS Clock Output	H/L
11	OUT	HiFi-CLK	HiFi IC Control Clock Output	H/L
12	OUT	HiFi-DATA	HiFi IC Control Data Output	H/L
13	OUT	A-MUTE	Audio Mute Control Signal (Mute="H")	H
14	IN	H-A-COMP	Head Amp Comparator Signal	H/L
15	OUT	C-ROTA	Color Phase Rotary Changeover Signal	H/L
16	OUT	H-A-SW	Video Head Amp Switching Pulse	H/L
17	OUT	RF-SW	Video Head Switching Pulse	H/L
18	OUT	HiFi-H-SW	HiFi Audio Head Switching Pulse	H/L
19	OUT	REC-CTL (+)	Record Control Signal (+)	H/L
20	OUT	REC-CTL (-)	Record Control Signal (-)	H/L
21	IN	C-SYNC	Composite Synchronized Pulse	PULSE
22	–	GND	GND	–
23	–	N.U.	Not Used	–
24	–	OSDVss	OSDVss	–
25	IN	REC-SAF-SW	Recording Safety SW Detect (With Record tab="L"/ With out Record tab="H")	H/L
26	IN	C-VIDEO-IN	Composite Video Signal Input (Slicer)	–
27	IN	V-HOLD	Condenser Connected Terminal (Slicer)	–
28	–	HLF	LPF Connected Terminal (Slicer)	–
29	–	GND	GND	–
30	OUT	OSD-BB-OUT	Composite Video Signal Output (Blue Back)	–
31	OUT	OSD-CHARA-OUT	Character Output (Superimposed)	–
32	–	OSDVcc	OSDVcc	–
33	OUT	D-V SYNC-OUT	Dummy V-sync Output	H/Hi-z
34	IN	RESET	System Reset Signal (Reset= "L")	L
35	IN	OSC_{IN}	Clock Input for letter size	–
36	OUT	OSC_{OUT}	Clock Output for letter size	–
37	–	Vcc	Vcc	–
38	IN	X_{IN}	Main Clock Input 14.31818 MHz	–
39	OUT	Xout	Main Clock Output	–
40	–	Vss	Vss(GND)	–
41	IN	XC IN	Sub Clock 32 kHz	–
42	OUT	XC OUT	Sub Clock 32 kHz	–
43	IN	CLKSEL	Clock Select (GND)	L
44	–	N.U.	Not Used	–
45	OUT	SP/LP /SLP	Tape Speed Select Signal (SP="L"/ LP="Z"/SLP="H")	H/Z/L
46	–	N.U.	Not Used	–
47	OUT	TRICK/ C-G/APC	Special Playback /Copy Guard/APC Control Signal	H/Z/L
48	OUT	C-F/R	Capstan Motor FWD/REV Control Signal (FWD="L"/ REV="H")	H/L

Pin No.	IN/ OUT	Signal Name	Function	Active Level
49	IN	T-REEL	Take Up Reel Rotation Signal	PULSE
50	–	N.U.	Not Used	–
51	IN	C-FG	Capstan Motor Rotation Detection Pulse	PULSE
52	IN	D-FG	Drum Motor Rotation Detection Pulse	PULSE
53	IN	D-PG	Drum Motor Pulse Generator	PULSE
54	IN	PB-CTL	Playback Control Signal	PULSE
55	OUT	C-CONT	Capstan Motor Control Signal	PWM
56	OUT	D-CONT	Drum Motor Control Signal	PWM
57	–	N.U.	Not Used	–
58	–	N.U.	Not Used	–
59	OUT	LM-FWD/ REV	Loading Motor FWD/REV Output	H/Z/L
60	OUT	P-ON-L	Power On Signal to Low	L
61	OUT	D-PB	Playback Instruction Signal (Playback="L")	L
62	OUT	D-REC	Delayed Record Signal	H
63	IN	P-DOWN -L	Power Voltage Down Detector Signal	L
64	–	N.U.	Not Used	–
65	IN	HiFi/NOR -IN	Audio Mode Input HiFi="L"/Normal="H"	H/L
66	OUT	BLUE BACK-ON	Blueback Control Signal	H
67	IN	ST/SAP-IN	Tuner Stereo/Sap Detector Signal Input	A/D
68	IN	END-S	Tape End Position Detect Signal	A/D
69	IN	AFC	Automatic Frequency Control Signal	A/D
70	IN	V-ENV	Video Envelope Comparator Signal	A/D
71	IN	PG-DELAY	Video Head Switching Pulse Signal Adjusted Voltage	A/D
72	IN	KEY-1	A/D Key Data Signal	A/D
73	IN	KEY-2	A/D Key Data Signal	A/D
74	IN	LD-SW	Deck Mode Position Detect Signal	A/D
75	IN	ST-S	Tape Start Position Detect Signal	A/D
76	–	AVcc	A/D Converter Power Input/ Standard Voltage Input	–
77	–	FLDVcc	FLDVcc	–
78	–	N.U.	Not Used	–
79	–	N.U.	Not Used	–
80	–	N.U.	Not Used	–
81	OUT	G1	Display Digit	H/L
82	OUT	G2	Display Digit	H/L
83	OUT	G3	Display Digit	H/L
84	OUT	G4	Display Digit	H/L
85	OUT	a	Display Segment	H/L
86	OUT	b	Display Segment	H/L
87	OUT	c	Display Segment	H/L
88	OUT	d	Display Segment	H/L
89	OUT	f	Display Segment	H/L
90	OUT	g	Display Segment	H/L
91	OUT	h	Display Segment	H/L
92	OUT	i	Display Segment	H/L
93	OUT	j	Display Segment	H/L
94	OUT	e	Display Segment	H/L
95	–	N.U.	Not Used	–
96	–	N.U.	Not Used	–
97	–	N.U.	Not Used	–
98	–	N.U.	Not Used	–
99	–	N.U.	Not Used	–
100	–	N.U.	Not Used	–

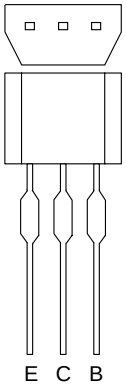
Notes:

Abbreviation for Active Level:

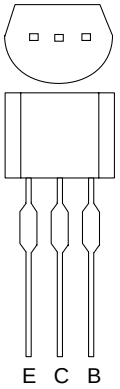
PWM ---------- Pulse Wide Modulation

A/D ---------- Analog - Digital Converter

LEAD IDENTIFICATIONS

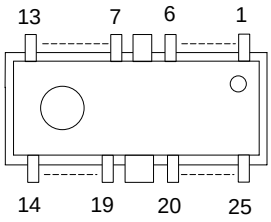


BN1F4M-T
BA1F4M-T
KTA1266(GR)
KTC3193(Y)
KTC3199(Y,GR,BL)
2SC2785(J.H.F.K)
2SC2058(Q)
KRA103M
KRC103M
DTC124ESA
2SA1015-GR(TPE2)
DTA124ESA

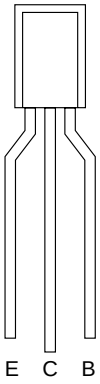


2SC1815-Y(TPE2)
2SC1815-GR(TPE2)
2SC3331(T,U)
2SC2120-Y(TPE2)
KTC3203(Y)

BD6655FP



2SC536NF(NG)-NPA-AT



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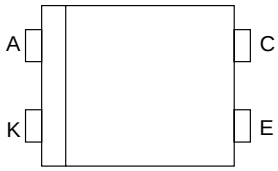
PC-17T1



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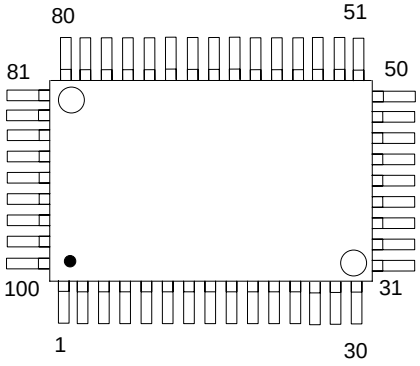

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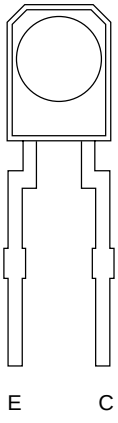

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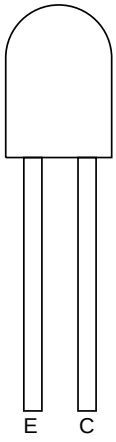

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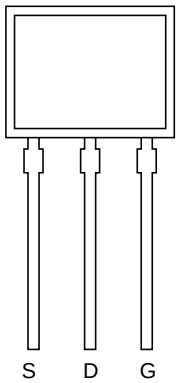
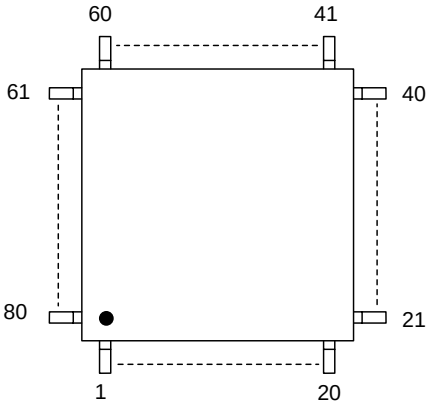
2SK2599



LA72653M



Note:
A: Anode
K: Cathode
E: Emitter
C: Collector
B: Base
R: Reference
S: Source
G: Gate
D: Drain

DECK MECHANISM SECTION

VIDEO CASSETTE RECORDER

VT-FX665A
VT-FX665AC

DECK MECHANISM SECTION

- **Standard Maintenance**
- **Mechanical Alignment Procedures**
- **Disassembly/Assembly of Mechanism**
- **Alignment for Mechanism**

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Standard Maintenance 2-1-1
Fixture and Tape for Adjustment 2-2-1
Mechanical Alignment Procedures 2-3-1
Disassembly / Assembly Procedures of Deck Mechanism 2-4-1
Alignment Procedures of Mechanism 2-4-9

STANDARD MAINTENANCE

Service Schedule of Components

H: Hours ❍: Check ●: Change

Deck		Periodic Service Schedule			
Ref. No.	**Part Name**	**1,000 H**	**2,000 H**	**3,000 H**	**4,000 H**
B2	Cylinder Assembly	❍	●	❍	●
B3	Loading Motor Assembly			●	
B8	Pulley Assembly		●		●
B27	Tension Lever Sub Assembly		●		●
B31	AC Head Assembly			●	
B573, B574	Reel (S), Reel (T)			●	
B37	Capstan Motor		●		●
B52	Cap Belt		●		●
*B73	FE Head			●	
B133	Idler Assembly		●		●
B410	Pinch Arm (A) Assembly		●		●
B414	M Brake S Assembly		●		●
B416	M Brake T Assembly		●		●
B525	LDG Belt		●		●

Notes:

1. Clean all parts for the tape transport (Upper Drum with Video Head / Pinch Roller / Audio Control Head / Full Erase Head) using 90% Isopropyl Alcohol.
2. After cleaning the parts, do all DECK ADJUSTMENTS.
3. For the reference numbers listed above, refer to Deck Exploded Views.

   * B73 ------ VCR Model only

Cleaning

Cleaning of Video Head

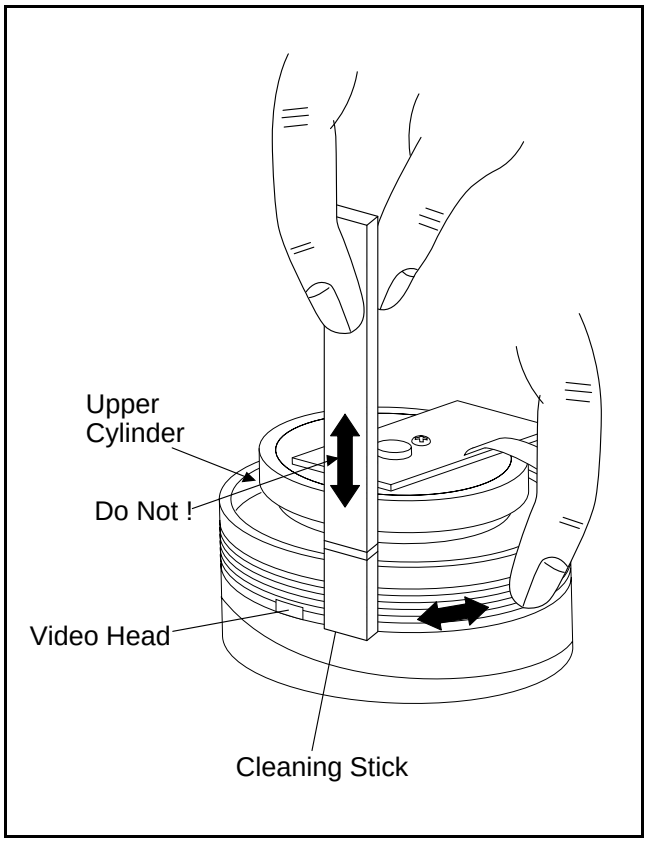
Clean the head with a head cleaning stick or chamois cloth.

Procedure

1. Remove the top cabinet.
2. Put on a glove (thin type) to avoid touching the upper and lower drum with your bare hand.
3. Put a few drops of 90% Isopropyl alcohol on the head cleaning stick or on the chamois cloth and, by slightly pressing it against the head tip, turn the upper drum to the right and to the left.

Notes:

1. The video head surface is made of very hard material, but since it is very thin, avoid cleaning it vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit.
3. Do not reuse a stained head cleaning stick or a stained chamois cloth.



Cleaning of Audio Control Head

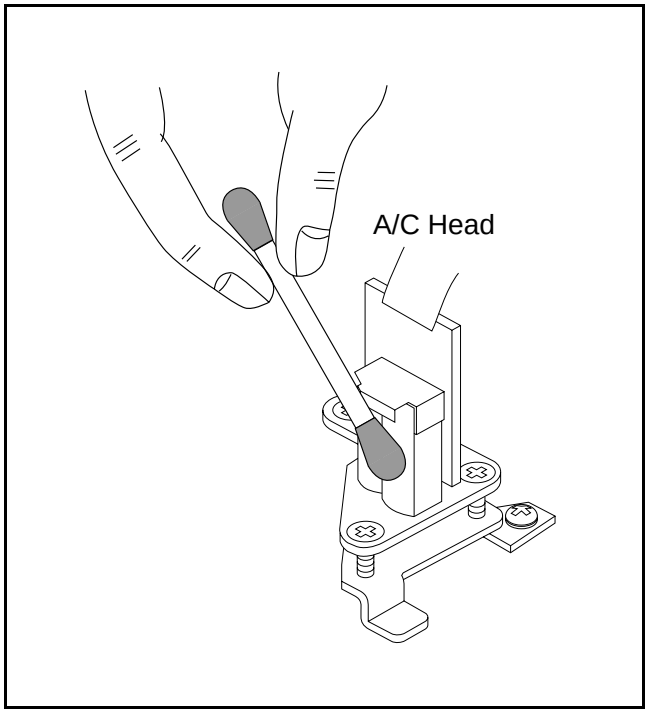
Clean the head with a cotton swab.

Procedure

1. Remove the top cabinet.
2. Dip the cotton swab in 90% isopropyl alcohol and clean the audio control head. Be careful not to damage the upper drum and other tape running parts.

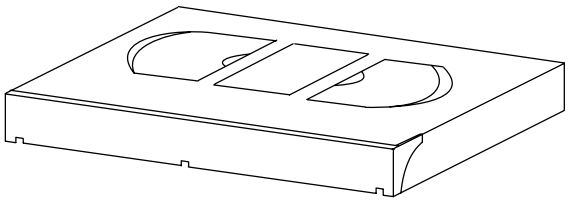
Notes:

1. Avoid cleaning the audio control head vertically.
2. Wait for the cleaned part to dry thoroughly before operating the unit or damage may occur.

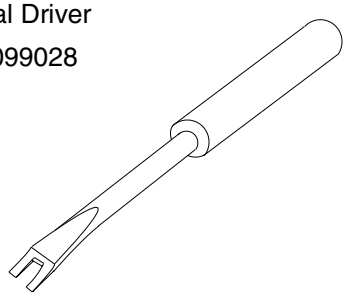


FIXTURE AND TAPE FOR ADJUSTMENT

1. Alignment Tape
   No. 7099089 (30HMP2-1)



2. Special Driver
   No. 7099028



How To Use The Fixtures And Tape

Item No.	Name	Part No.	How to used
1	Alignment Tape	7099089	● Head Switching Point ● Tape Interchangeability Alignment
2	Special Driver	7099028	● Guide Roller

MECHANICAL ALIGNMENT PROCEDURES

Explanation of alignment for the tape to correctly run starts on the next page. Refer to the information below on this page if a tape gets stuck, for example, in the mechanism due to some electrical trouble of the unit.

Service Information

A. Method for Manual Tape Loading/Unloading

To load a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Case and Front Assembly.
3. Insert a cassette tape. Though the tape will not be automatically loaded, make sure that the cassette tape is all the way in at the inlet of the Cassette Holder. To confirm this, lightly push the cassette tape further in and see if the tape comes back out, by a spring motion, just as much as you have pushed in.
4. Turn the LDG Belt in the appropriate direction shown in Fig. M1 for a minute or two to complete this task.

To unload a cassette tape manually:

1. Disconnect the AC plug.
2. Remove the Top Case and Front Assembly.
3. Make sure that the Moving guide preparations are in the Eject Position.
4. Turn the LDG Belt in the appropriate direction shown in Fig. M1 until the Moving guide preparations come to the Eject Position. Stop turning when the preparations begin clicking or can not be moved further. However, the tape will be left wound around the cylinder.
5. Turn the LDG Belt in the appropriate direction continuously, and the cassette tape will be ejected. Allow a minute or two to complete this task.

B. Method to place the Cassette Holder in the tape-loaded position without a cassette tape

1. Disconnect the AC Plug.
2. Remove the Top Case and Front Assembly.
3. Turn the LDG Belt in the appropriate direction shown in Fig. M1. Release the locking tabs shown in Fig. M1 and continue turning the LDG Belt until the Cassette Holder comes to the tape-loaded position. Allow a minute or two to complete this task.

Top View

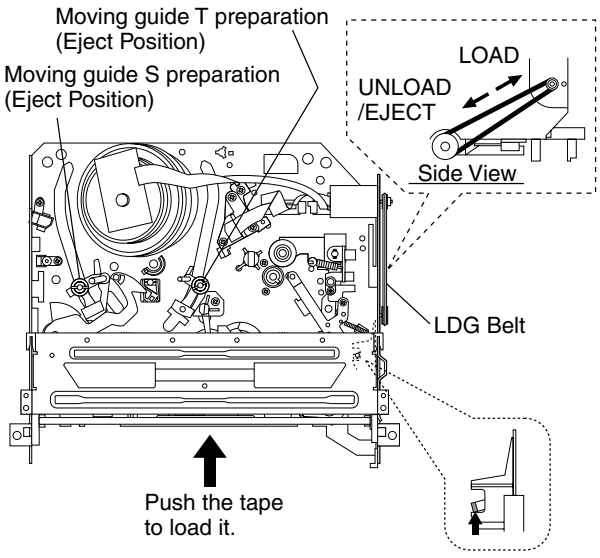


Fig. M1

Bottom View

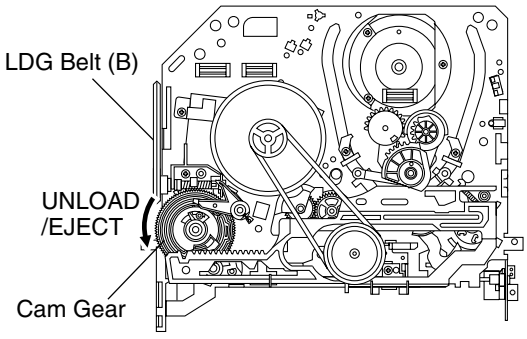


Fig. M2

1. Tape Interchangeability Alignment

Note:

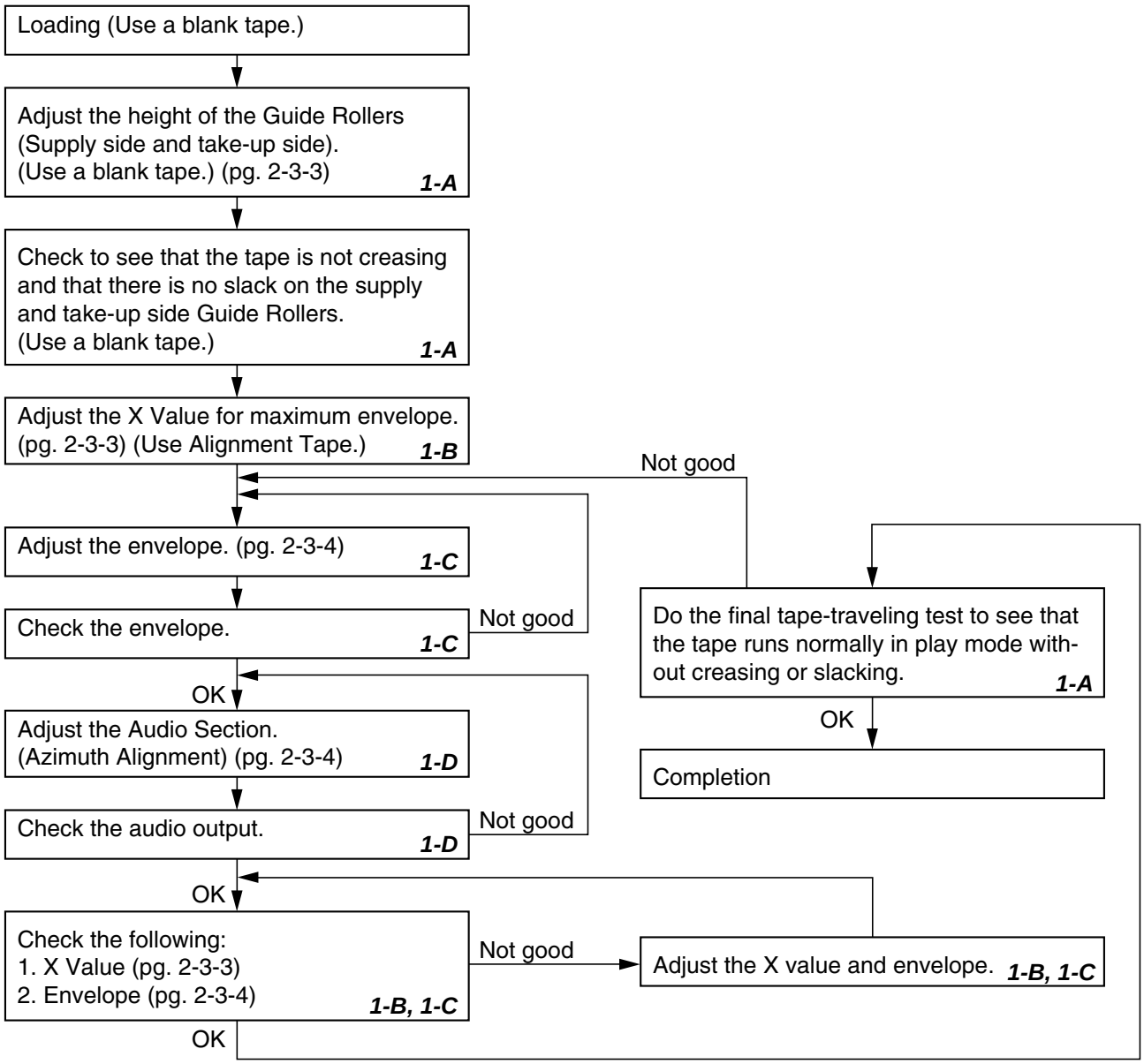
To do these alignment procedures, make sure that the Tracking Control Circuit is set to the center position every time a tape is loaded or unloaded. (Refer to page 2-3-4, procedure 1-C, step 2.)

Equipment required:

Dual Trace Oscilloscope
VHS Alignment Tape (30HMP2-1)
Guide Roller Adj. Screwdriver
X-Value Adj. Screwdriver

Note: Before starting this Mechanical Alignment, do all Electrical Adjustment procedures.

Flowchart of Alignment for tape traveling


Loading (Use a blank tape.)
Adjust the height of the Guide Rollers (Supply side and take-up side). (Use a blank tape.) (pg. 2-3-3) 1-A
Check to see that the tape is not creasing and that there is no slack on the supply and take-up side Guide Rollers. (Use a blank tape.) 1-A
Adjust the X Value for maximum envelope. (pg. 2-3-3) (Use Alignment Tape.) 1-B
Not good
Adjust the envelope. (pg. 2-3-4) 1-C
Check the envelope. 1-C
Not good
OK
Adjust the Audio Section. (Azimuth Alignment) (pg. 2-3-4) 1-D
Check the audio output. 1-D
Not good
OK
Check the following:
1. X Value (pg. 2-3-3)
2. Envelope (pg. 2-3-4) 1-B, 1-C
Not good
Adjust the X value and envelope. 1-B, 1-C
OK
Do the final tape-traveling test to see that the tape runs normally in play mode without creasing or slacking. 1-A
OK
Completion

1-A. Preliminary/Final Checking and Alignment of Tape Path

Purpose:

To make sure that the tape path is well stabilized.

Symptom of Misalignment:

If the tape path is unstable, the tape will be damaged.

Note: Do not use an Alignment Tape for this procedure. If the unit is not correctly aligned, the tape may be damaged.

1. Play back a blank cassette tape and check to see that the tape runs without creasing at Guide Rollers [2] and [3], and at points A and B on the lead surface. (Refer to Fig M3 and M4.)
2. If creasing is apparent, align the height of the guide rollers by turning the top of Guide Rollers [2] and [3] with a Guide Roller Adj. Screwdriver. (Refer to Fig. M3 and M5.)
   Note: Beneath each Guide Roller, there is a small screw. (Refer to Fig. M5.) This screw works to apply adequate torque to the shaft of each Guide Roller so that the Guide Roller turns properly. Even when adjusting the height of the Guide Roller(s), do not touch these two small screws.
3. Check to see that the tape runs without creasing at Take-up Guide Post [4] or without snaking between Guide Roller [3] and AC Head. (Fig. M3 and M5)
4. If creasing or snaking is apparent, adjust the Tilt Adj. Screw of the AC Head. (Fig. M6)

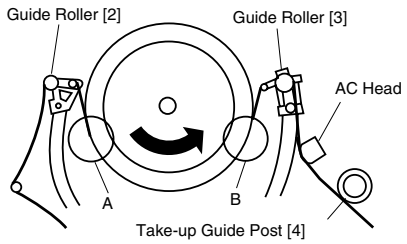


Fig. M3

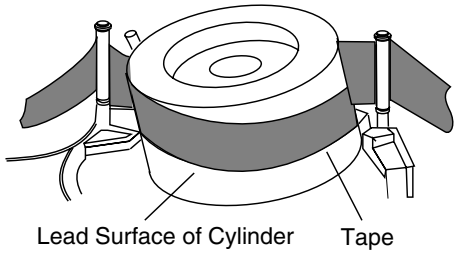


Fig. M4

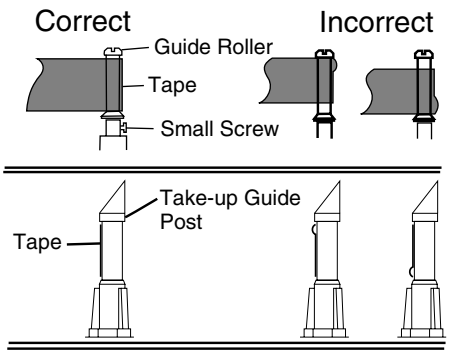


Fig. M5

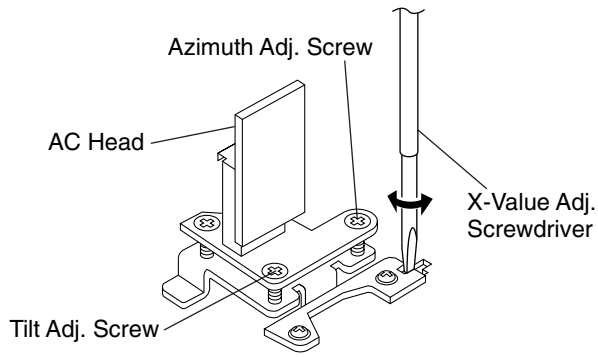


Fig. M6

1-B. X Value Alignment

Purpose:

To align the Horizontal Position of the Audio/Control/Erase Head.

Symptom of Misalignment:

If the Horizontal Position of the Audio/Control/Erase Head is not properly aligned, maximum envelope cannot be obtained at the Neutral position of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) and TP303 (CTL) on the Main CBA. Use TP302 (RF-SW) as a trigger.
2. Play back the Gray Scale of the Alignment Tape (30HMP2-1) and confirm that the PB FM signal is present.
3. Set the Tracking Control Circuit to the center position by pressing the CH UP button then the PLAY button on the VCR. (Refer to note on bottom of page 2-3-4.)
4. Use the X-Value Adj. Screwdriver so that the PB FM signal at TP301 (C-PB) is maximum. (Fig. M6)
5. Press CH UP button on the VCR until the CTL waveform has shifted by approx. +2msec. Make sure that the envelope is simply attenuated (shrinks in height) during this process so that you will know the envelope has been at its peak.

6. Press CH DOWN button on the VCR until the CTL waveform has shifted from its original position (not the position achieved in step 5, but the position of CTL waveform in step 4) by approximately -2msec. Make sure that the envelope is simply attenuated (shrinks in height) once CTL waveform passes its original position and is further brought in the minus direction.
7. Set the Tracking Control Circuit to the center position by pressing the CH UP button and then the PLAY button on the VCR.

1-C. Checking/Adjustment of Envelope Waveform

Purpose:

To achieve a satisfactory picture and precise tracking.

Symptom of Misalignment:

If the envelope output is poor, noise will appear in the picture. The tracking will then lose precision and the playback picture will be distorted by any slight variation of the Tracking Control Circuit.

1. Connect the oscilloscope to TP301 (C-PB) on the Main CBA. Use TP302 (RF-SW) as a trigger.
2. Play back the Gray Scale on the Alignment Tape (30HMP2-1). Set the Tracking Control Circuit to the center position by pressing the CH UP and then the PLAY button on the VCR. Adjust the height of Guide Rollers [2] and [3] (Fig. M3, Page 2-3-3) watching the oscilloscope display so that the envelope becomes as flat as possible. To do this adjustment, turn the top of the Guide Roller with the Guide Roller Adj. Screwdriver.
3. If the envelope is as shown in Fig. M7, adjust the height of Guide Roller [2] (Refer to Fig. M3) so that the waveform looks like the one shown in Fig. M9.
4. If the envelope is as shown in Fig. M8, adjust the height of Guide Roller [3] (Refer to Fig. M3) so that the waveform looks like the one shown in Fig. M9.
5. When Guide Rollers [2] and [3] (Refer to Fig.M3) are aligned properly, there is no envelope drop either at the beginning or end of track as shown in Fig. M9.

Note: Upon completion of the adjustment of Guide Rollers [2] and [3] (Refer to Fig. M3), check the X Value by pushing the CH UP or DOWN buttons alternately, to check the symmetry of the envelope. Check the number of pushes to ensure center position. The number of pushes UP to achieve 1/2 level of envelope should match the number of pushes DOWN from center. If required, redo the "X Value Alignment."

1-D. Azimuth Alignment of Audio/Control/ Erase Head

Purpose:

To correct the Azimuth alignment so that the Audio/Control/Erase Head meets tape tracks properly.

Symptom of Misalignment:

If the position of the Audio/Control/Erase Head is not properly aligned, the Audio S/N Ratio or Frequency Response will be poor.

1. Connect the oscilloscope to the audio output jack on the rear side of the deck.
2. Play back the alignment tape (30HMP2-1) and confirm that the audio signal output level is 8 kHz.
3. Adjust Azimuth Adj. Screw so that the output level on the AC Voltmeter or the waveform on the oscilloscope is at maximum. (Fig. M6)

Dropping envelope level at the beginning of track.

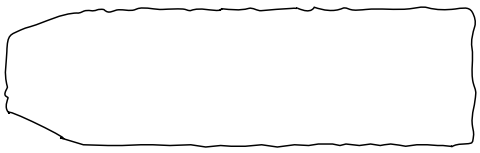


Fig. M7

Dropping envelope level at the end of track.

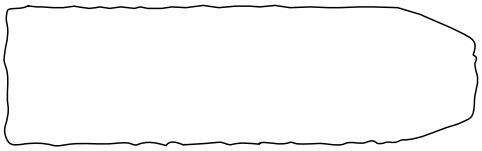


Fig. M8

Envelope is adjusted properly. (No envelope drop)

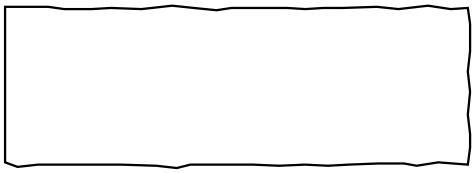


Fig. M9

DISASSEMBLY/ASSEMBLY PROCEDURES OF DECK MECHANISM

Before following the procedures described below, be sure to remove the deck assembly from the cabinet. (Refer to CABINET DISASSEMBLY INSTRUCTIONS on page 1-6-1.)

All the following procedures, including those for adjustment and replacement of parts, should be done in Eject mode; see the positions of [44] and [45] in Fig. DM1 on page 2-4-3. When reassembling, follow the steps in reverse order.

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[1]	[1]	Top Plate	T	DM3	2(S-1), *2(L-1)	
[2]	[1]	Cassette Holder Assembly	T	DM4		
[3]	[2]	Slider L	T	DM5	(S-2)	
[4]	[2]	Slider R	T	DM5	(S-3)	
[5]	[4]	Lock Lever	T	DM5	(S-4), *(P-1)	
[6]	[2]	Cassette Plate	T	DM5		
[7]	[7]	Cylinder Assembly	T	DM1, DM6	3(S-5), Connector A, Connector B	
[8]	[8]	Loading Motor Assembly	T	DM1, DM7	2(S-6), (S-7), LDG Belt, ACH Connector AN(9P) and 9B	
[9]	[1]	Tape Guide Assembly	T	DM1, DM8	*(P-2), (C-8)	
[10]	[1]	Door Opener B	T	DM1, DM8	(S-8), *(L-2)	
[11]	[10]	Pinch Arm (B) Assembly	T	DM1, DM8	*(P-3)	
[12]	[11]	Pinch Arm (A) Assembly	T	DM1, DM8		
[13]	[13]	FE Head	T	DM1, DM9	(S-9)	
[14]	[14]	First Post Assembly	T	DM1, DM9	(S-10)	
[15]	[15]	Prism	T	DM1, DM9	(S-11)	
[16]	[16]	Standard Post	T	DM1, DM9	*(L-4)	
[17]	[1]	Slider Shaft	T	DM10	(S-12), *(L-7)	
[18]	[17]	C Drive Lever L	T	DM10		
[19]	[17]	C Drive Lever R	T	DM10		
[20]	[12]	Capstan Motor	B	DM2, DM11	3(S-14), Cap Belt	
[21]	[21]	FF Arm Holder	B	DM2, DM12	(S-15)	
[22]	[21]	Clutch Assembly	B	DM2, DM12	(C-1)	
[23]	[21]	FF Arm	B	DM2, DM12		
[24]	[24]	Cam Holder	B	DM2, DM13	(C-2)	
[25]	[24]	F Brake Assembly	B	DM2, DM13		
[26]	[26]	Cam Gear (B)	B	DM2, DM13	(C-3), *(P-4)	
[27]	[27]	Mode Gear	B	DM2, DM14	(C-4)	
[28]	[27]	Mode Lever	B	DM2, DM14	(C-5)	
[29]	[28]	Cam Gear (A)	B	DM2, DM14		
[30]	[29]	Pully Assembly	B	DM2, DM14		
[31]	[30]	Worm Holder	B	DM2, DM14	(S-16)	
[32]	[28]	Sensor Gear	B	DM1, DM15	(C-6)	
[33]	[28]	Idler Assembly	B	DM1, DM15		
[34]	[28]	BT Arm	B	DM2, DM15	*(P-5)	

STEP /LOC. No.	START-ING No.	PART		REMOVAL		INSTALLATION
				Fig. No.	REMOVE/*UNHOOK/ UNLOCK/RELEASE/ UNPLUG/DESOLDER	ADJUSTMENT CONDITION
[35]	[28]	Loading Arm S Assembly	B	DM2, DM15		(+) Refer to Alignment Sec. Pg. 2-4-9
[36]	[35]	Loading Arm T Assembly	B	DM2, DM15		(+) Refer to Alignment Sec. Pg. 2-4-9
[37]	[28]	M Brake T Assembly	T	DM1, DM16	*(P-6)	
[38]	[38]	M Brake S Assembly	T	DM1, DM16	*(P-7)	
[39]	[38]	Tension Lever Sub Assembly	T	DM1, DM16	*(P-8), (C-9)	
[40]	[39]	T Lever Holder	T	DM1, DM16	*(L-5)	
[41]	[2]	M Gear	T	DM1, DM16	(C-7)	
[42]	[37]	Reel T	T	DM1, DM16		
[43]	[39]	Reel S	T	DM1, DM16		
[44]	[43]	Moving Guide S Preparation	T	DM1, DM17	(S-17), Slide Holder S	
[45]	[36]	Moving Guide T Preparation	T	DM1, DM17	(S-18), Slide Holder T	
[46]	[20]	TG Post Assembly	T	DM1, DM17	*(L-3)	
[47]	[29]	Rack Assembly	R	DM18		(+) Refer to Alignment Sec. Pg. 2-4-10
[48]	[47]	F Door Opener A	R	DM18	*(P-9)	
[49]	[49]	Cleaner Lever Assembly	T	DM1,DM6		
[50]	[49]	CL Post	T	DM1,DM6	*(L-6)	
↓ ①	↓ ②	↓ ③	↓ ④	↓ ⑤	↓ ⑥	↓ ⑦

①: Follow steps in sequence. When reassembling, follow the steps in reverse order.
These numbers are also used as Identification (location) No. of parts in the figures.

②: Indicates the part to start disassembling with in order to disassemble the part in column (1).

③: Name of the part

④: Location of the part: T=Top B=Bottom R=Right L=Left

⑤: Figure Number

⑥: Identification of parts to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.
P=Spring, W=Washer, C=Cut Washer, S=Screw, *=Unhook, Unlock, Release, Unplug, or Desolder
e.g., 2(L-2) = two Locking Tabs (L-2).

⑦: Adjustment Information for Installation
(+): Refer to Deck Exploded Views for lubrication.

Top View

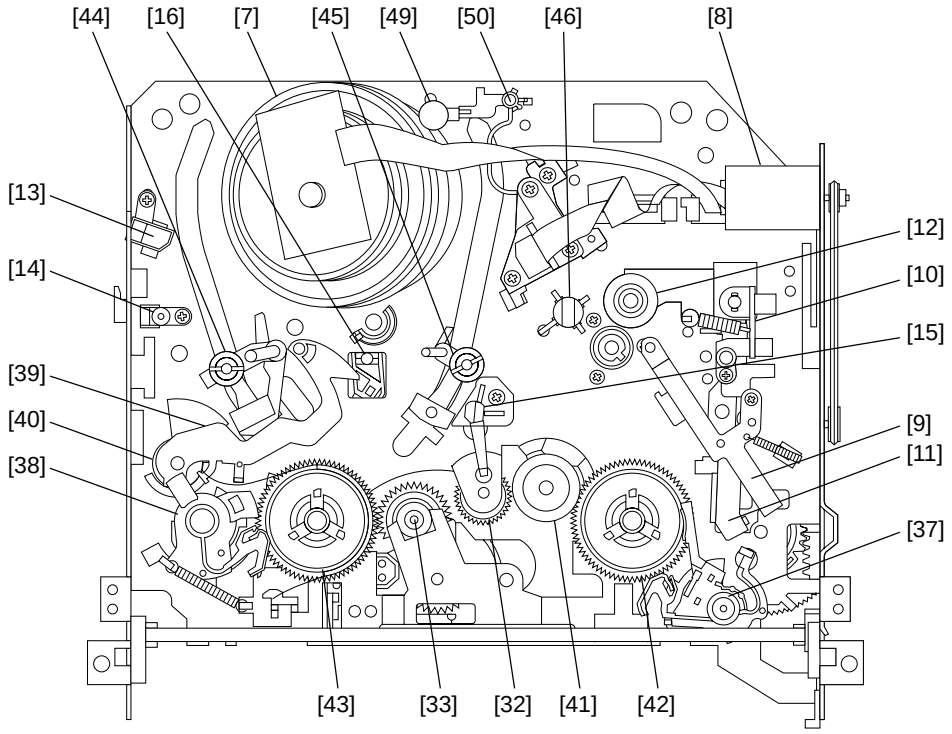


Fig. DM1

Bottom View

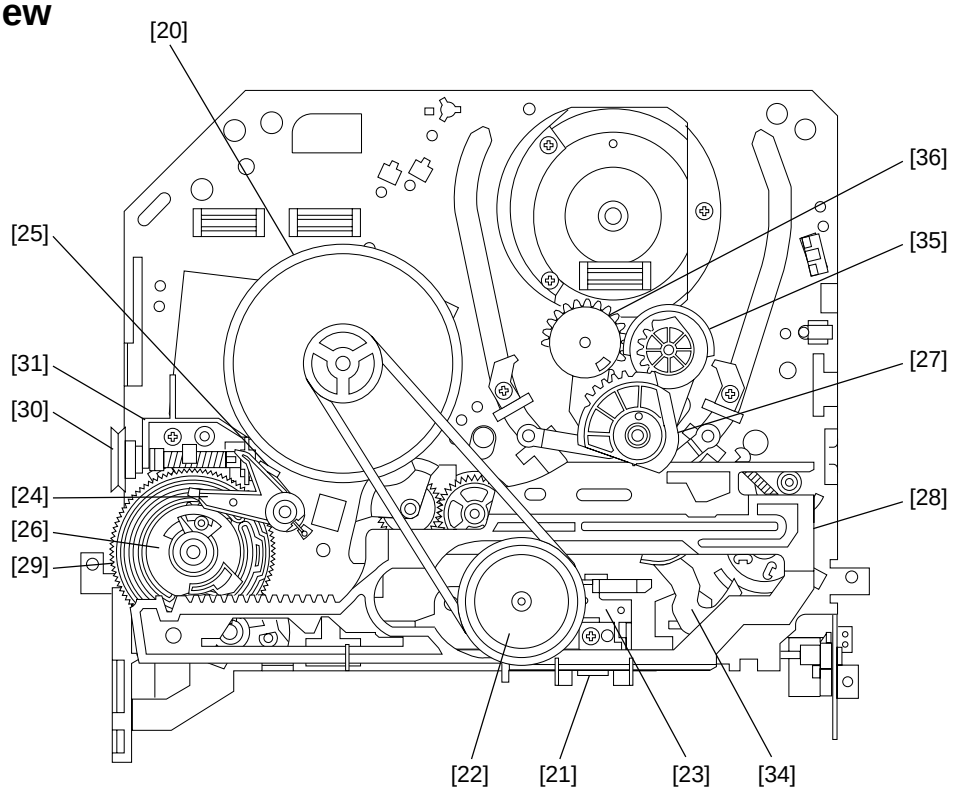


Fig. DM2

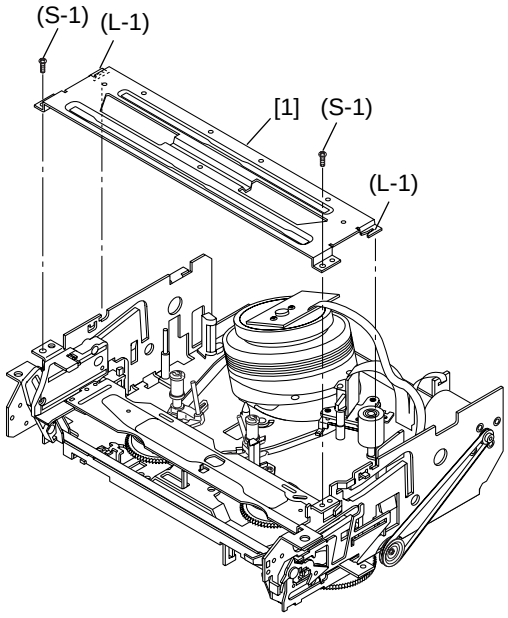


Fig. DM3

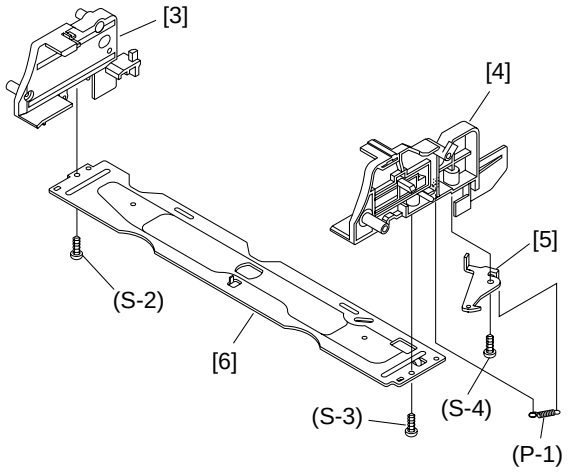
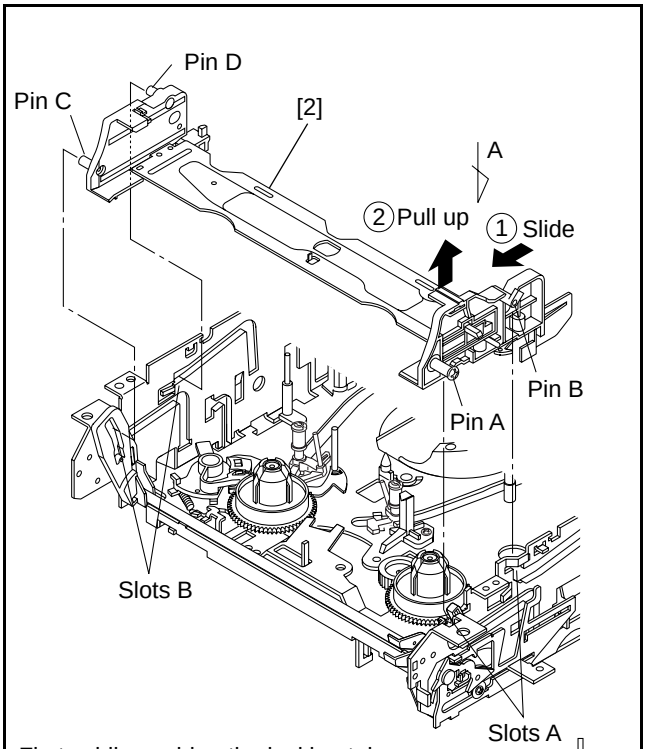


Fig. DM5



First, while pushing the locking tab as shown in the right, slide and pull up the right side on [2] to release Pin A and Pin B from the slots A.
Then, remove Pin C and Pin D on [2] from the slots B as shown.

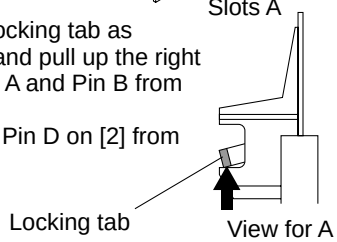


Fig. DM4

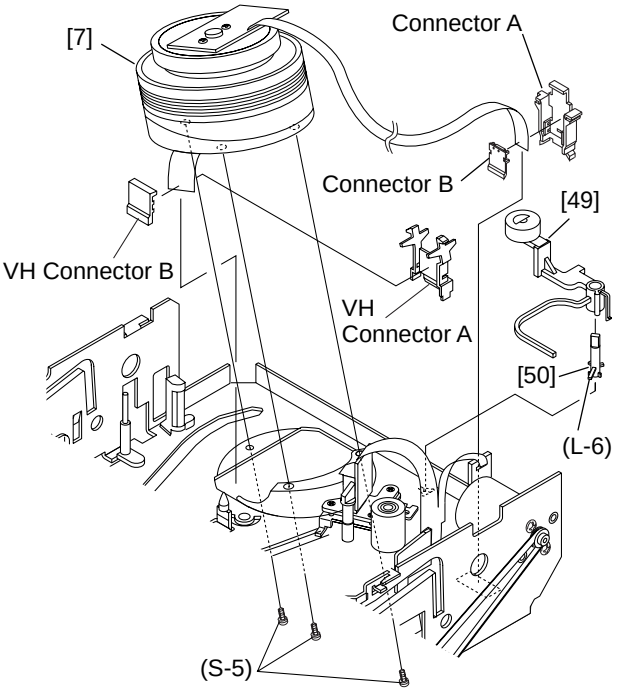


Fig. DM6

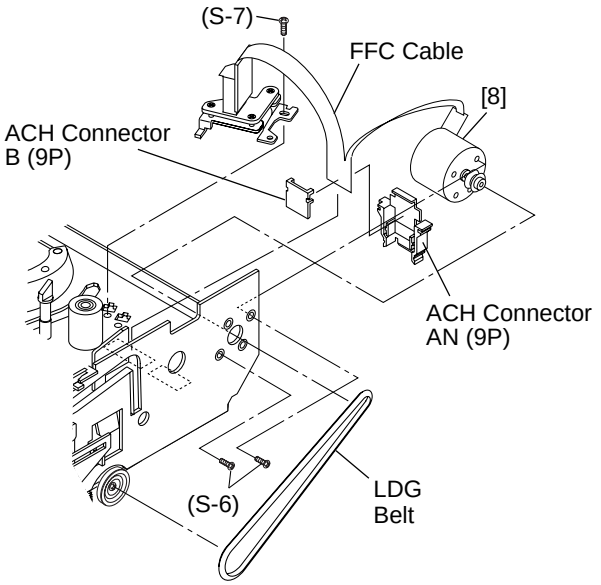


Fig. DM7

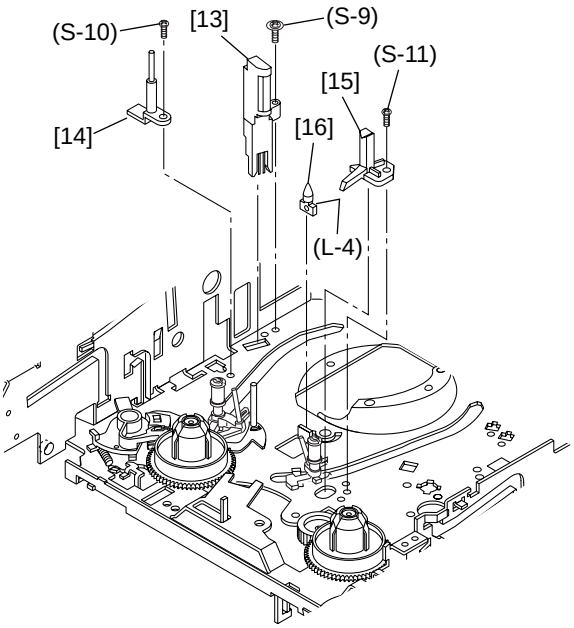


Fig. DM9

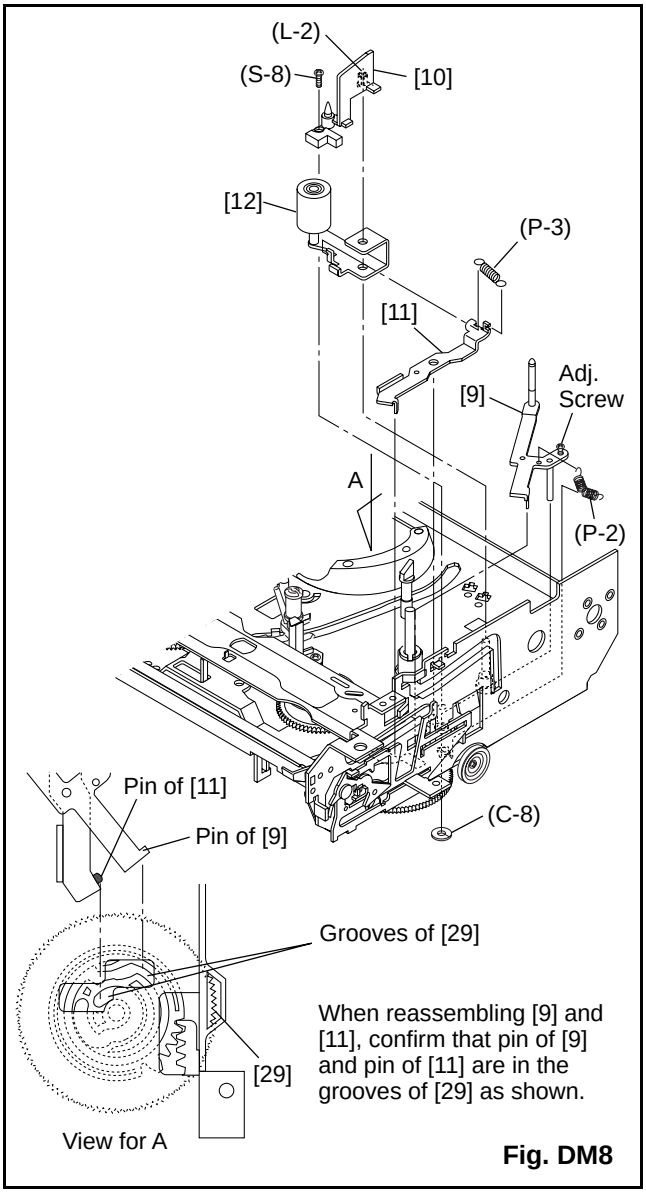


Fig. DM8

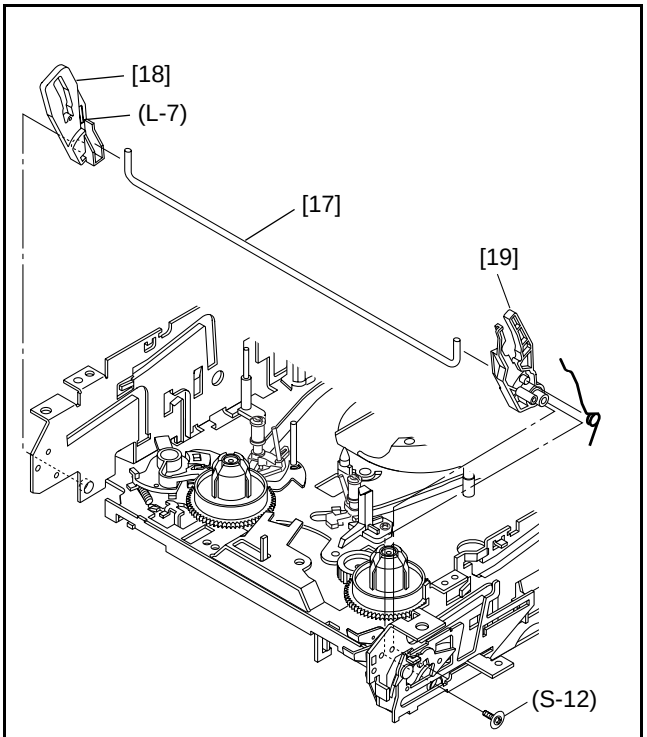


Fig. DM10

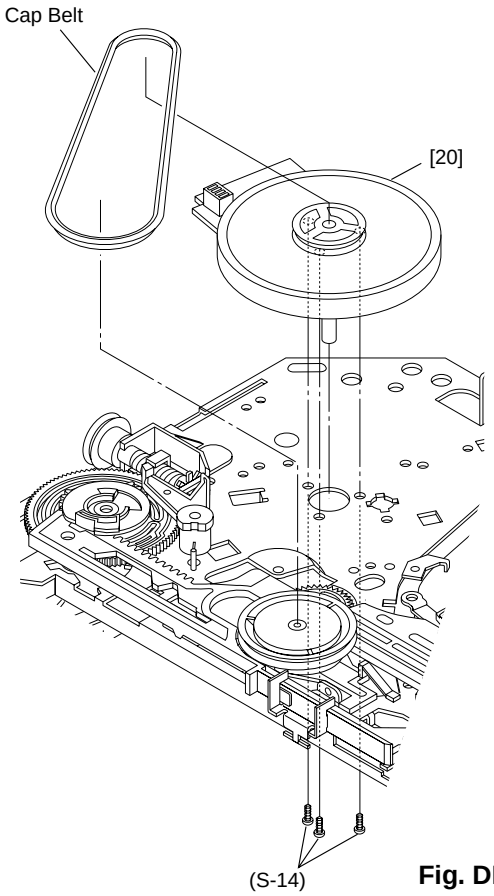


Fig. DM11

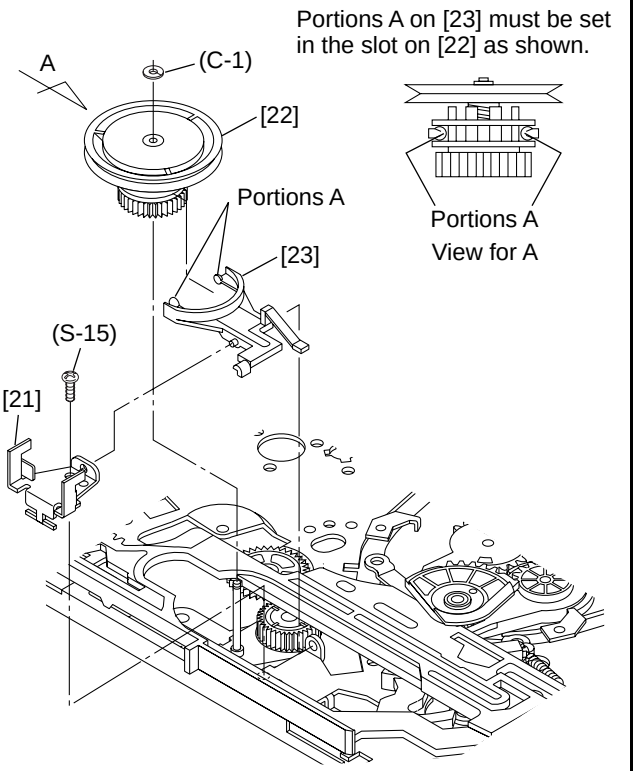


Fig. DM12

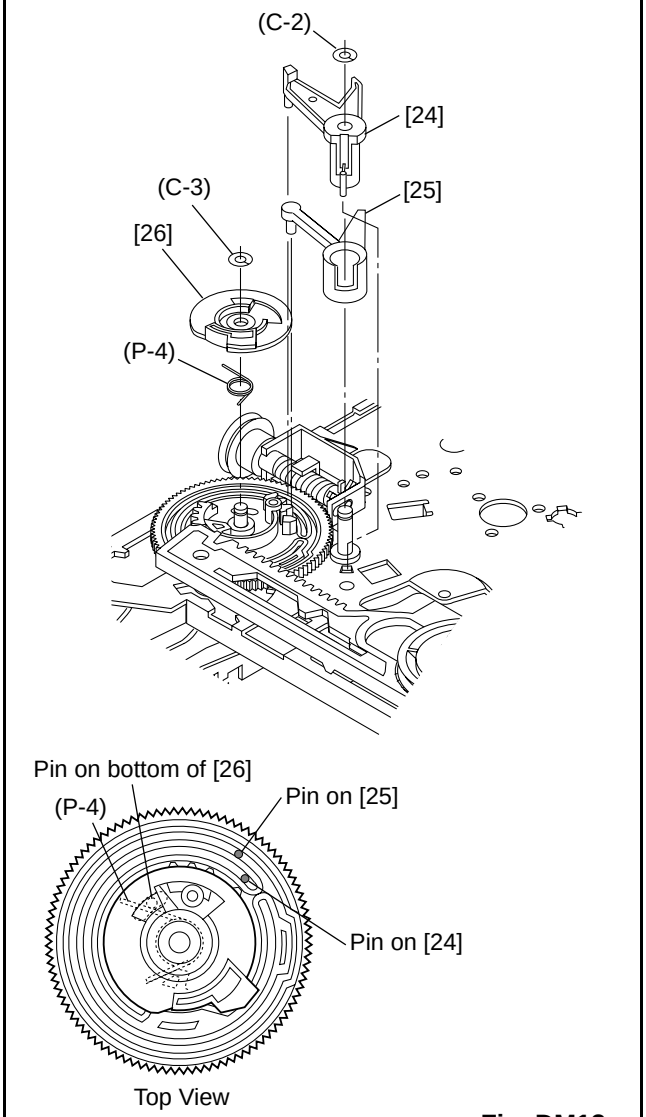
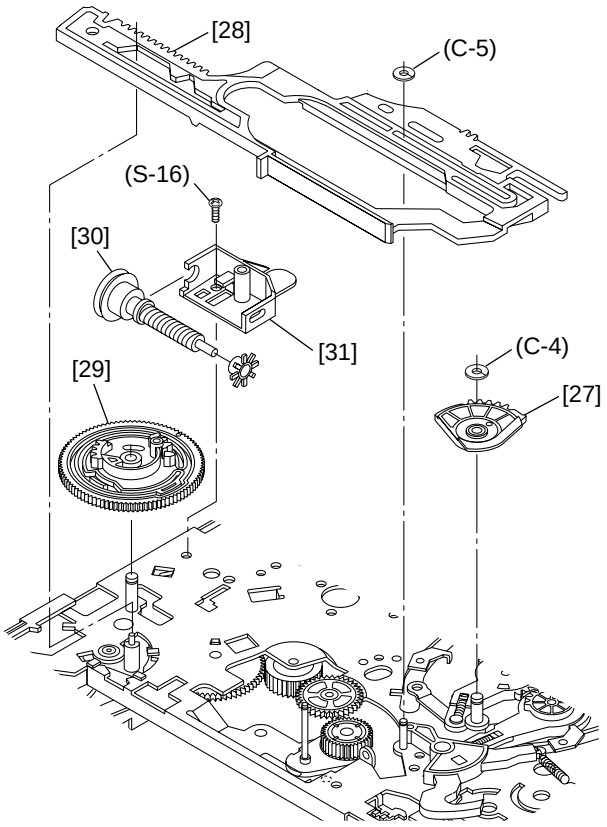
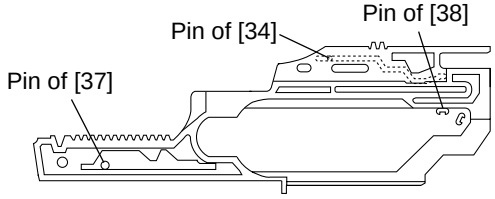


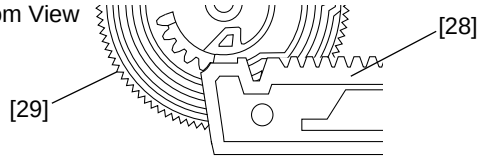
Fig. DM13



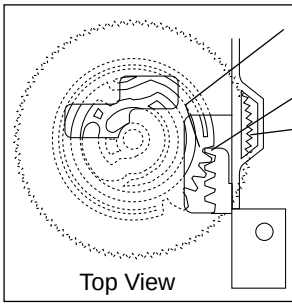
Position of Mode Lever when installed



Bottom View



Align [28] and [29] as shown.



When reassembling [29], meet the first groove on [29] to the first tooth on [47] as shown.

Fig. DM14

Refer to the Alignment Section, Page 2-4-9.

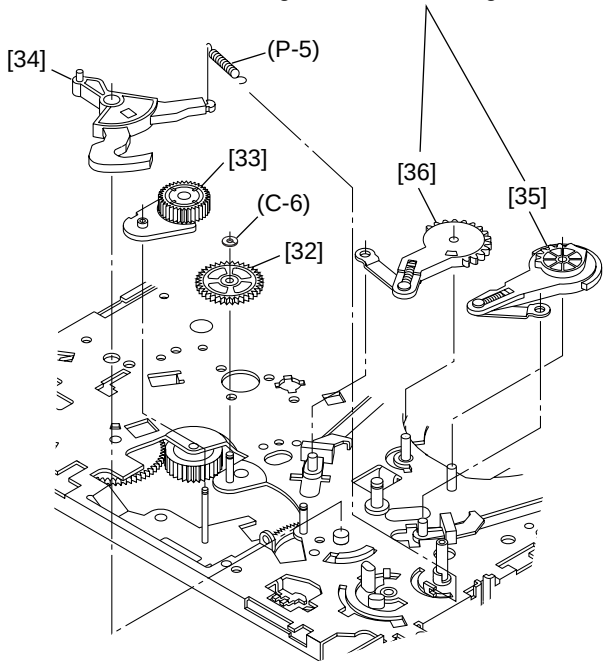


Fig. DM15

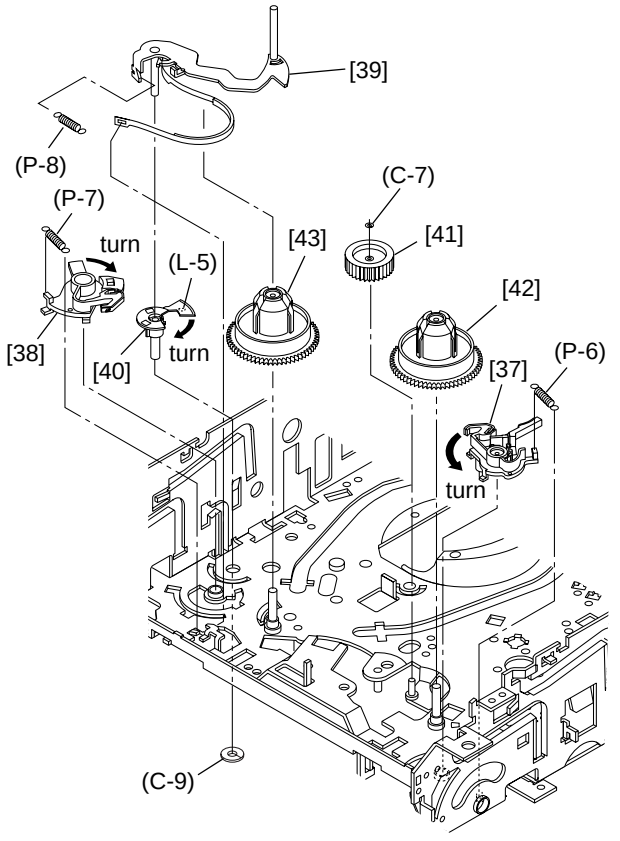


Fig. DM16

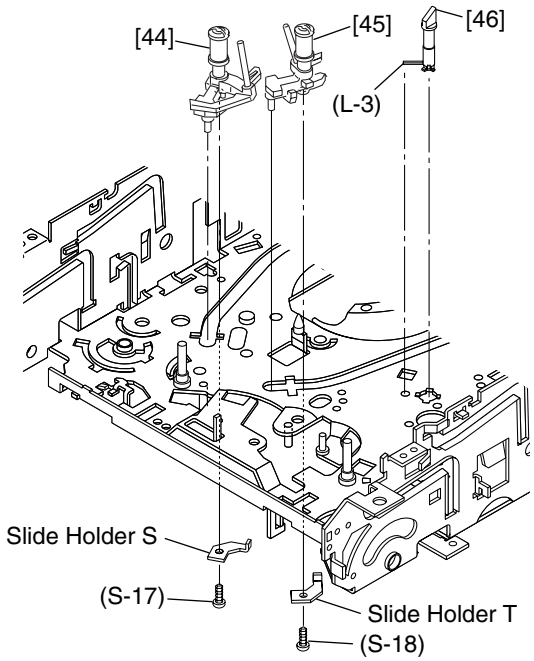


Fig. DM17

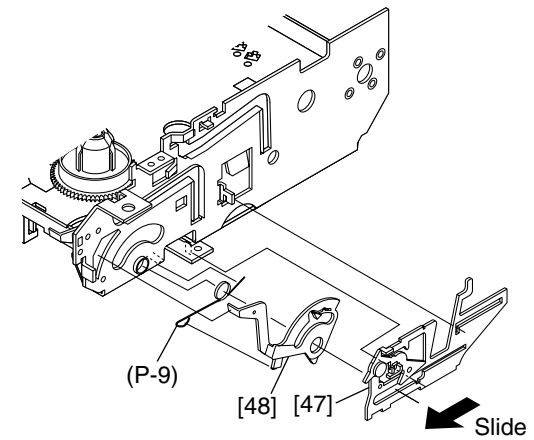


Fig. DM18

ALIGNMENT PROCEDURES OF MECHANISM

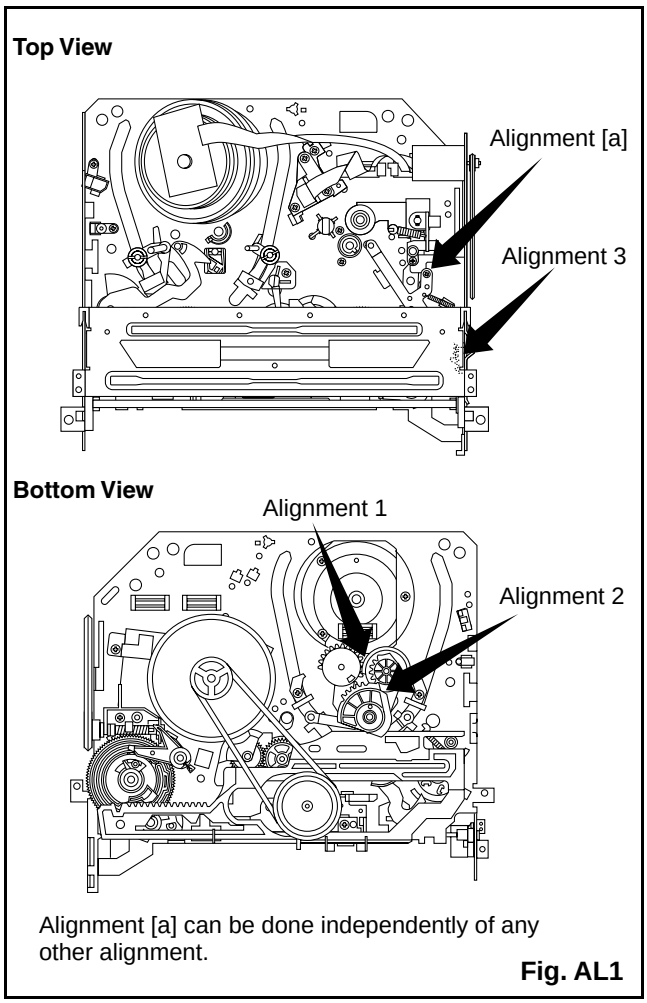
The following procedures describe how to align the individual gears and levers that make up the tape loading/unloading mechanism. Since information about the state of the mechanism is provided to the System Control Circuit only through the Mode Switch, it is essential that the correct relationship between individual gears and levers be maintained.

All alignments are to be performed with the mechanism in Eject mode, in the sequence given. Each procedure assumes that all previous procedures have been completed.

IMPORTANT:

If any one of these alignments is not performed properly, even if off by only one tooth, the unit will unload or stop and it may result in damage to the mechanical or electrical parts.

Alignment points in Eject Position



Alignment [a] can be done independently of any other alignment.

Fig. AL1

Alignment 1

Loading Arm, S and T Assembly

Install Loading Arm S and T Assembly so that their triangle marks point to each other as shown in Fig. AL2.

Alignment 2

Mode Gear

Keeping the two triangles pointing at each other, install the Loading Arm T Assembly so that the last tooth of the gear meets the most inside teeth of the Mode Gear. See Fig. AL2.

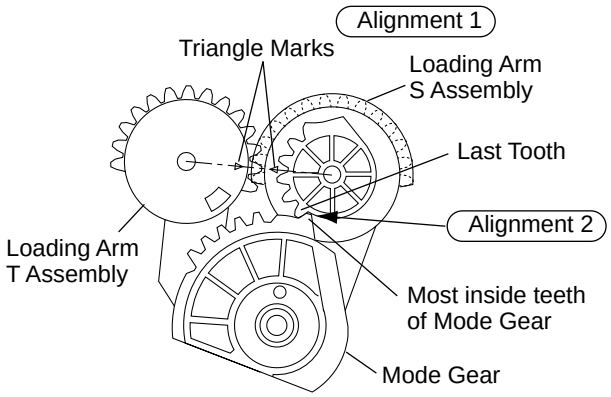


Fig. AL2

Alignment [a]

Tape Guide Assembly

Measurement of the screw must be as specified in Fig. AL3.

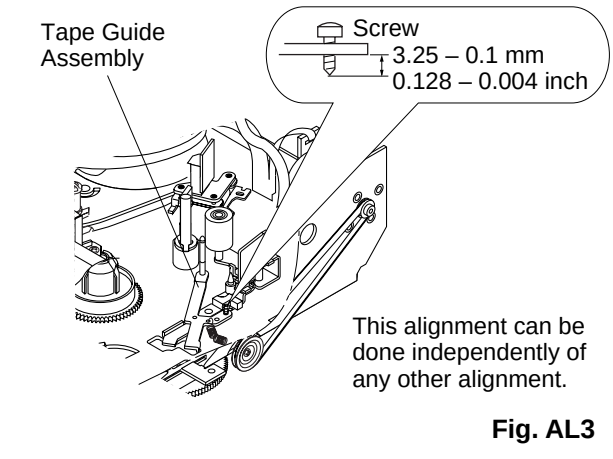


Fig. AL3

Alignment 3

Cam Gear (A), Rack Assembly

Install the Rack Assembly so that the first tooth on the gear of the Rack Assembly meets the first groove on the Cam Gear (A) as shown in Fig. AL4.

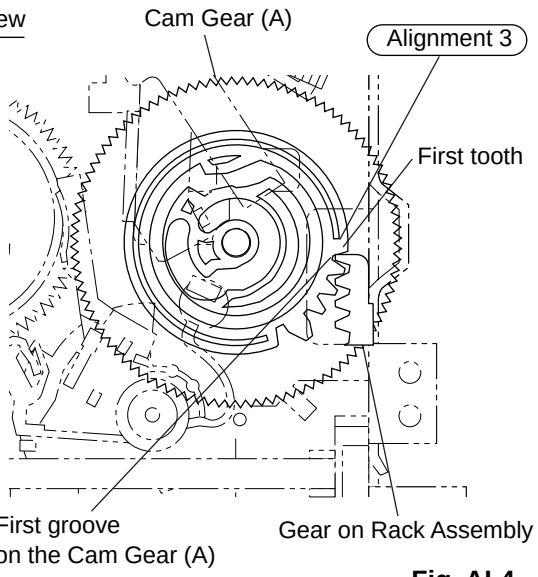


Fig. AL4

EXPLODED VIEWS AND PARTS LIST SECTION

VIDEO CASSETTE RECORDER

VT-FX665A
VT-FX665AC

EXPLODED VIEWS
AND PARTS LIST SECTION

- **Exploded views**
- **Parts List**

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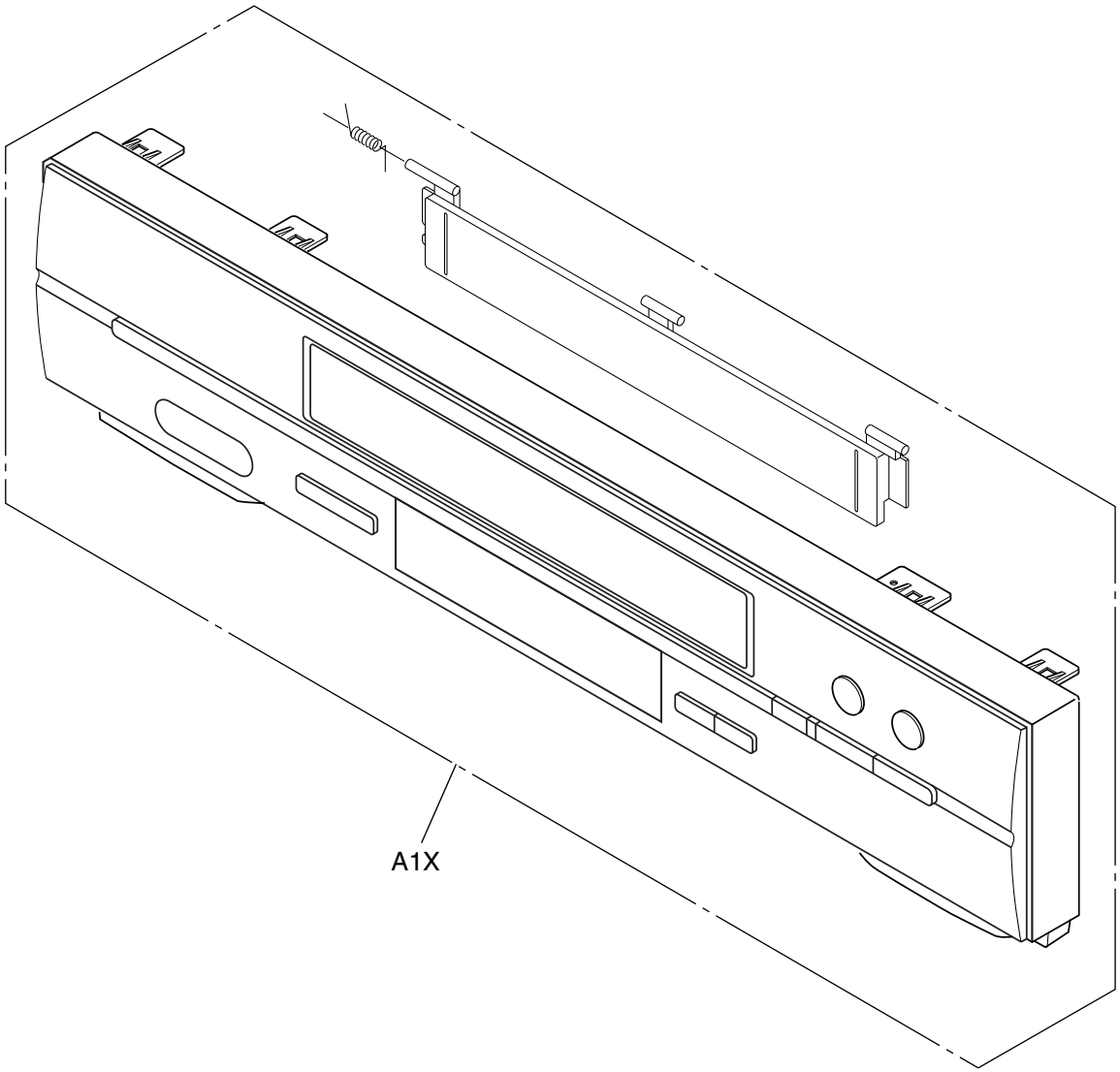
Mechanical Parts List 3-2-1
Electrical Parts List 3-3-1

EXPLODED VIEWS

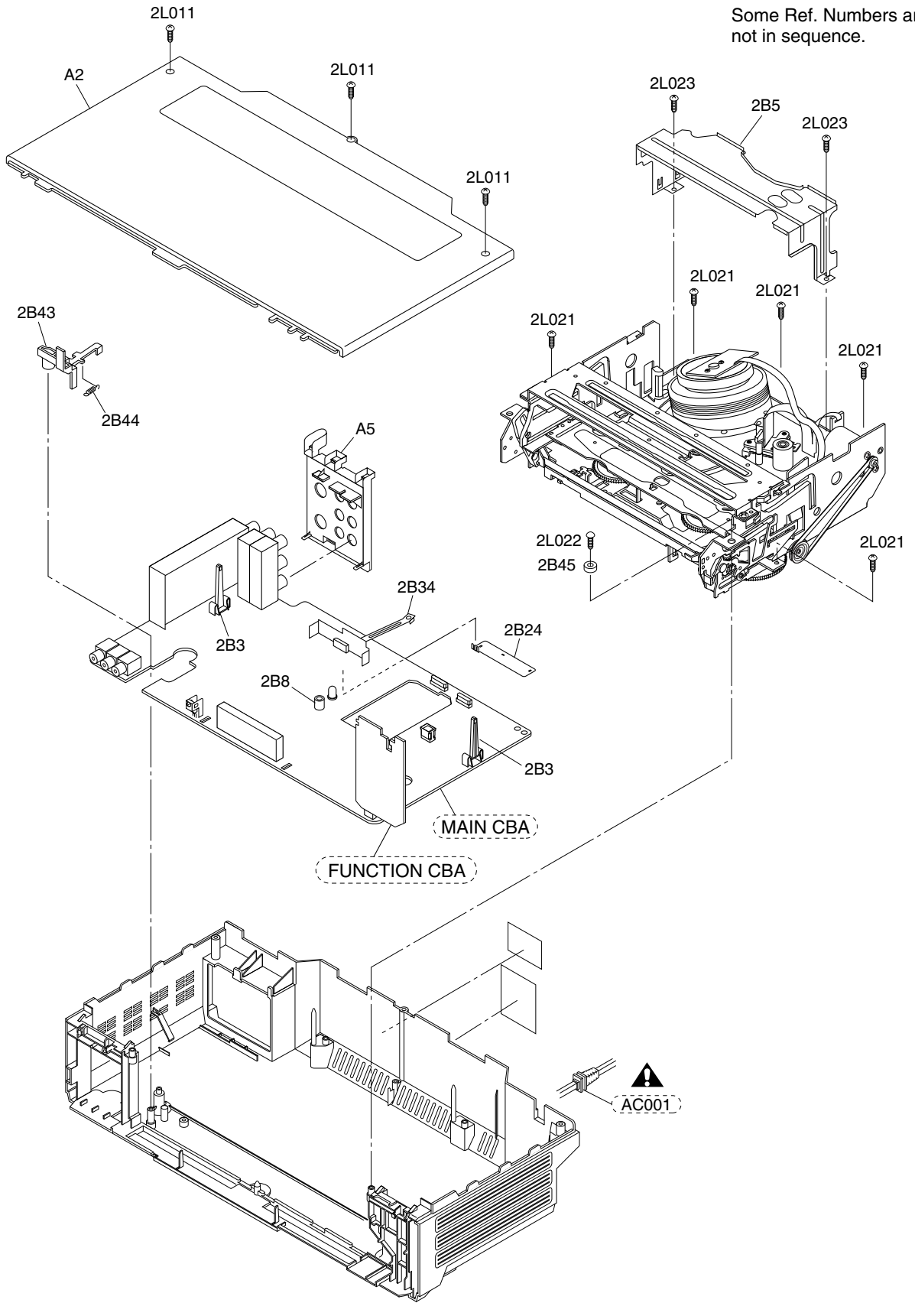
Front Panel



Cabinet

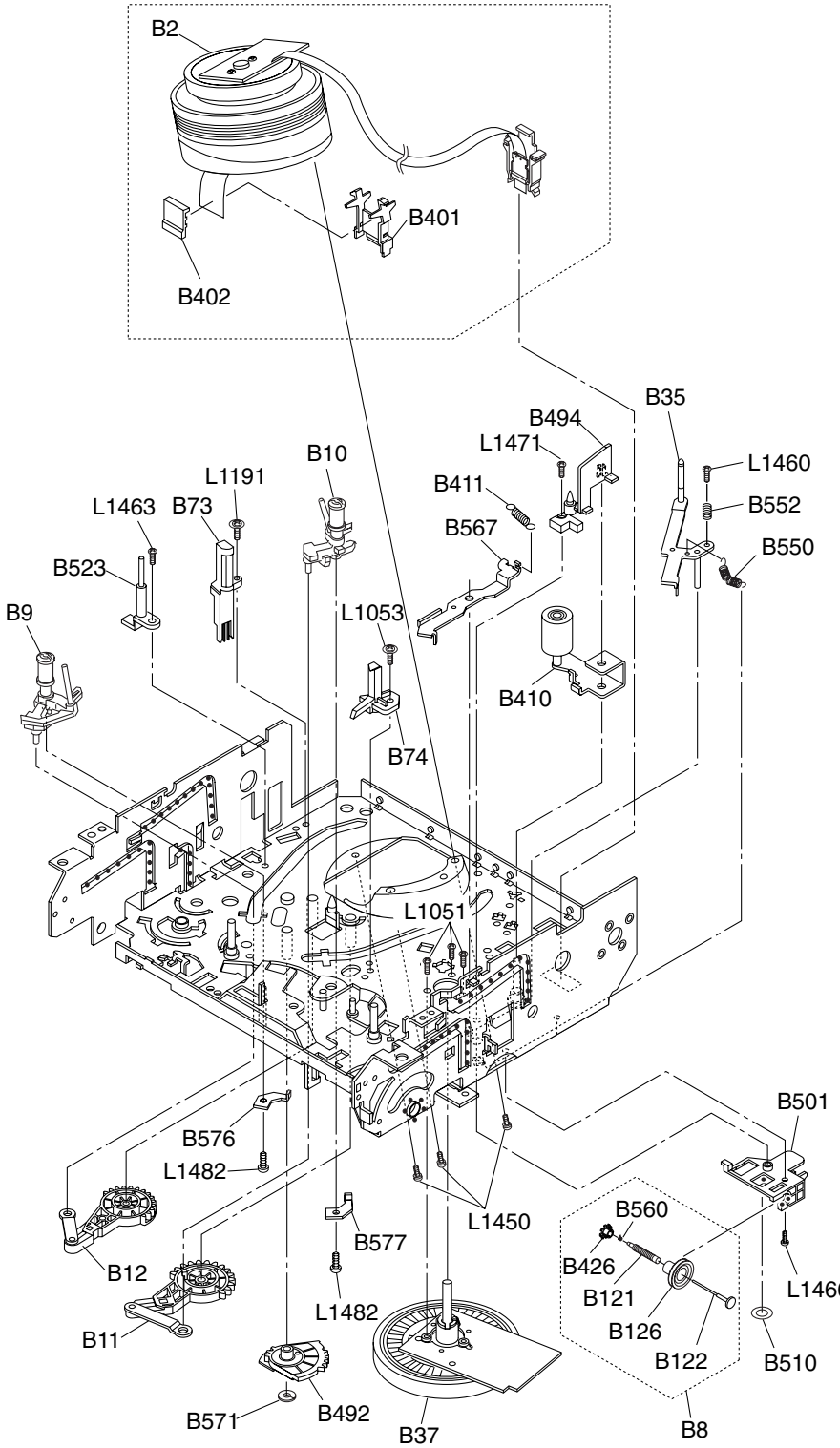
See Electrical Parts List for parts with this mark.

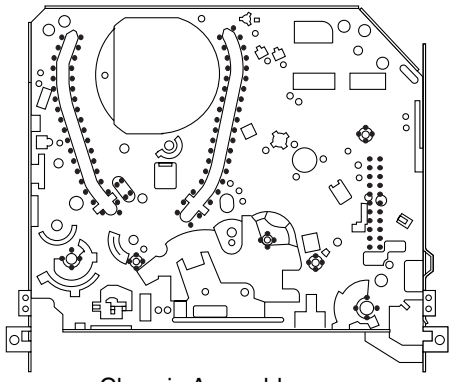
Some Ref. Numbers are not in sequence.



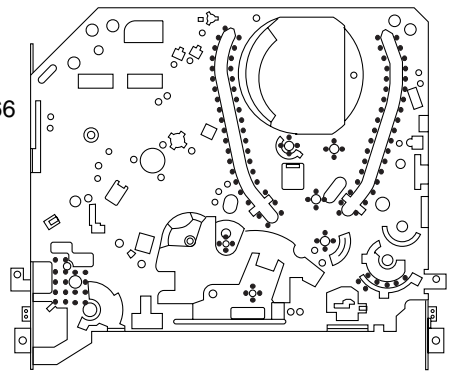
Deck Mechanism View 1

Mark	Description
•••••	Floil G-374G (Blue grease)





Chassis Assembly
Top View (Grease Point)

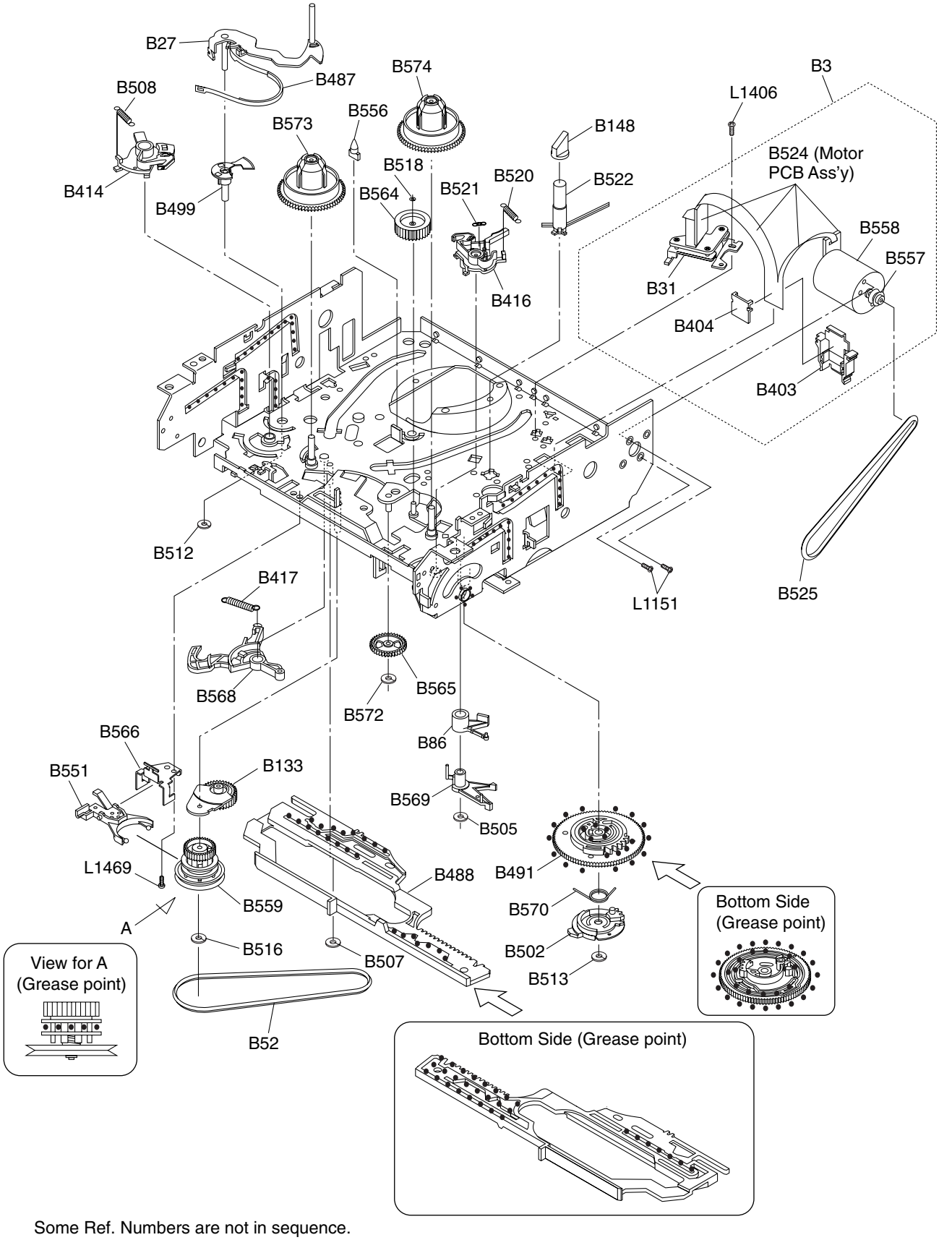


Chassis Assembly
Bottom View (Grease Point)

Some Ref. Numbers are not in sequence.

Deck Mechanism View 2

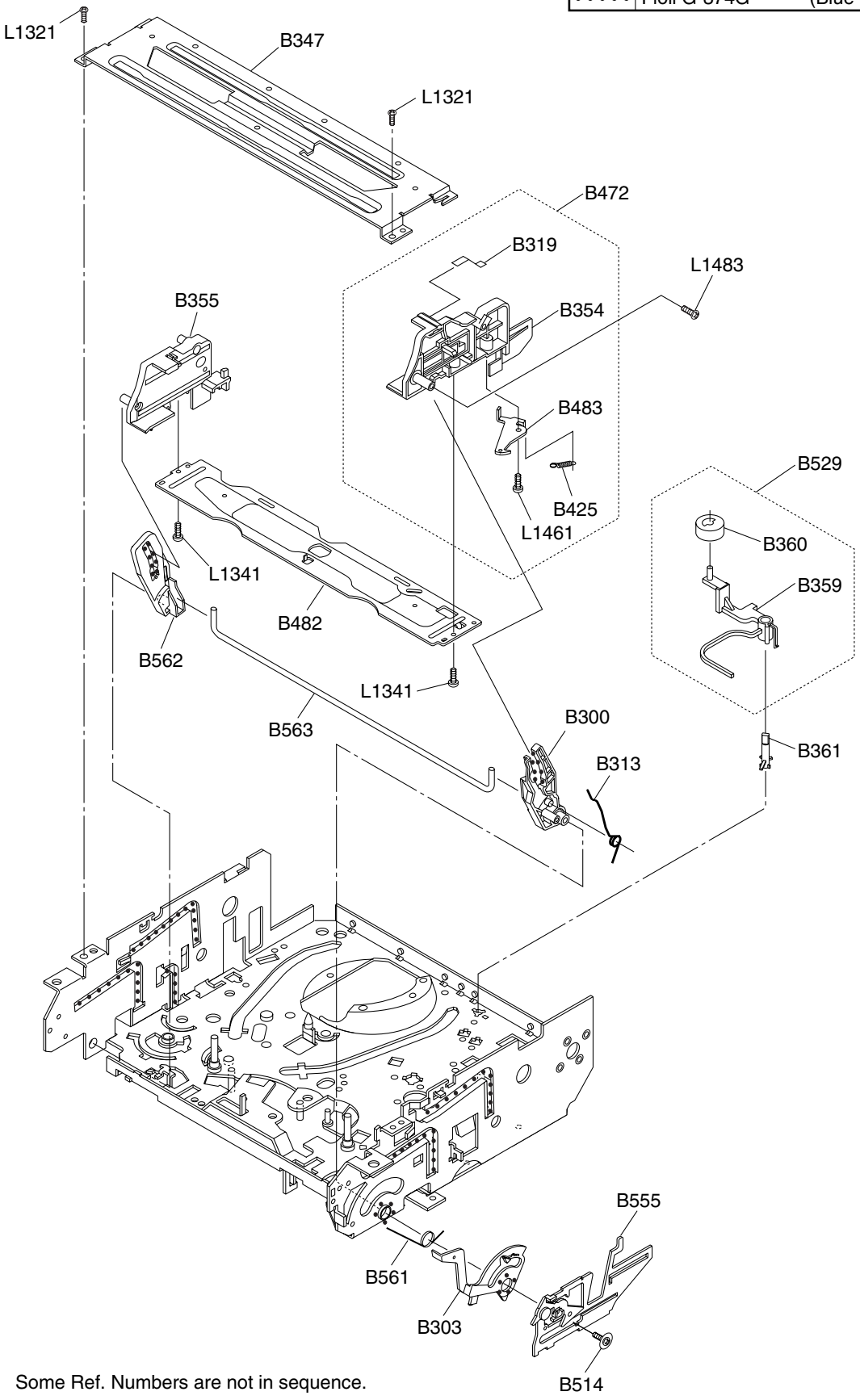
Mark	Description
• • • • •	Floil G-374G (Blue grease)



Some Ref. Numbers are not in sequence.

Deck Mechanism View 3

Mark	Description
• • • • •	Floil G-374G (Blue grease)



Some Ref. Numbers are not in sequence.

MECHANICAL PARTS LIST

SYMBOL-NO	P-NO	DESCRIPTION
		MECHANISM SECTION
2B3	TJ13885	HOLDER, SENSOR
2B5	TJ15107	SHIELD, CYLINDER
2B8	TJ15122	BUSH, LED
2B24	TJ15123	SHIELD, BOTTOM
2B34	TJ15124	SHIELD, HEAD
2B43	TJ15108	ARM, REC
2B44	TJ15109	SPRING, ARM
2B45	TJ15111	SPACER
2L011	TE13193	SCREW(3X10)
2L021	TJ10119	SCREW(3X10)
2L022	TJ15112	SCREW(3X12)
2L023	TJ14063	SCREW(M2.6X4)
A1X	TJ15101	PANEL, FRONT
A2	TJ15102	COVER, TOP
A5	TJ14088	BOARD, JACK
⚠ AC001	TJ15125	CORD, AC
B2	TJ15148	CYLINDER ASSY
B3	TJ15149	MOTOR, LOADING
B8	TJ15151	PULLEY ASSY
B9	TJ15152	GUIDE, MOVING(S)
B10	TJ15153	GUIDE, MOVING(T)
B11	TJ15154	ARM, LOADING(T)
B12	TJ15155	ARM, LOADING(S)
B27	TJ15156	LEVER, TENSION
B31	TJ15157	HEAD, AC
B35	TJ15158	GUIDE, TAPE
B37	TJ15159	MOTOR, CAPSTAN
B52	TJ15161	BELT, CAP
B73	TJ15162	HEAD, FE
B74	TJ15163	PRISM
B86	TJ15164	BRAKE(F)
B121	TJ15165	WORM
B122	TJ15166	SHAFT, WORM
B126	TJ15167	PULLEY
B133	TJ15168	IDLER ASSY
B148	TE12612	TG CAP
B300	TJ15169	LEVER, DRIVE
B303	TJ15171	OPENER, FOOR
B313	TJ15172	SPRING, DRIVE
B319	TJ13969	SPRING
B347	TJ15173	HOLDER, GUIDE
B354	TJ15174	SLIDER(R)
B355	TJ15175	SLODER(L)
B359	TJ15103	LEVER, CLEANER
B360	TJ15104	ROLLER, CLEANER
B361	TJ15105	POST
B401	TJ15176	CONNECTOR
B402	TJ15177	CONNECTOR
B403	TJ13984	CONNECTOR
B404	TJ15178	CONNECTOR
B410	TJ15179	ARM, PINCH
B411	TJ15181	SPRING, PINCH
B414	TJ15182	BRAKE(S)
B416	TJ15183	BRAKE(T)
B417	TJ15184	SPRING, TENSION
B425	TJ15185	SPRING, LOCK LEVER
B426	TJ15186	PULLEY KICK
B472	TJ15187	SLIDER(R)
B482	TJ15188	PLATE, CASSETTE
B483	TJ15189	LEVER, LOCK
B487	TJ15191	BRAKE, BAND
B488	TJ15192	LEVER, MODE
B491	TJ15193	GEAR, CAM(A)
B492	TJ15194	GEAR.MODE
B494	TJ15195	OPENER, DOOR
B499	TJ15196	HOLDER, LEVER(T)
B501	TJ15197	HOLDER, WORM
B502	TJ15198	GEAR, CAM(B)
B505	TJ10229	WASHER
B507	TJ14034	WASHER
B508	TJ15199	SPRING, BRAKE(S)
B510	TJ10229	WASHER
B512	TJ14034	WASHER
B513	TJ15201	WASHER
B514	TJ15202	SCREW, RACK
B516	TJ14034	WASHER
B518	TJ15203	WASHER
B520	TJ15204	SPRING, BRAKE(T)
B521	TJ15205	SPRING, SOFT
B522	TJ15206	POST ASSY
B523	TJ14038	POST
B524	TJ15207	PWB ASSY MOTOR
B525	TJ15208	BELT, LDG
B529	TJ15106	CLEANER ASSY
B550	TJ15209	GUIDE, TAPE
B551	TJ15211	ARM, FF
B552	TJ15212	SPRING, ADJUST
B555	TJ15213	RACK ASSY
B556	TJ15214	POST, STANDARD
B557	TJ15215	PULLEY, MOTOR
B558	TJ15216	MOTOR, LOADING
B559	TJ15217	CLUTCH ASSY
B560	TJ15218	SPRING, KICK
B561	TJ15219	SPRING, DOOR
B562	TJ15221	LEVER, DRIVE
B563	TJ15222	SHAFT, SLIDER
B564	TJ15223	GEAR(M)
B565	TJ15224	GEAR, SENSOR

SYMBOL-NO	P-NO	DESCRIPTION
B566	TJ15225	HOLDER, ARM
B567	TJ15226	ARM, PINCH(B)
B568	TJ15227	ARM(BT)
B569	TJ15228	HOLDER, CAM
B570	TJ15229	SPRING, CAM RACK
B571	TJ10229	WASHER
B572	TJ15203	WASHER
B573	TJ15231	REEL(S)
B574	TJ15232	REEL(T)
B576	TJ15233	HOLDER, SLIDE(S)
B577	TJ15234	HOLDER, SLIDE(T)
L1051	TJ14055	SCREW(M2.6X6)
L1053	TJ15235	SCREW(M2.6X8)
L1151	TJ15236	SCREW(M2.6X4)
L1191	TJ15237	SCREW(M2.6X8)
L1321	TJ10176	SCREW (3X6)
L1341	TE13298	SCREW, M2.6X6
L1406	TJ15238	HEAD, AC
L1450	TE12971	SCREW M2.6X5
L1460	TJ15239	SCREW(M2.6X6)
L1461	TJ14061	SCREW(M2.6X6)
L1463	TJ14063	SCREW(M2.6X4)
L1466	TJ14066	SCREW(M2.6X6)
L1469	TJ13452	SCREW(M2.6X6)
L1471	TJ14066	SCREW(M2.6X6)
L1482	TJ15241	SCREW(M2.3X4)
L1483	TJ15242	SCREW(M2.6X8)
L1484	TE13054	SCREW PRISM
		ACCESSORIES
X1	TJ15116	REMOTE HAND SET
X3	TJ15117	CABLE, RF

SYMBOL-NO	P-NO	DESCRIPTION

ELECTRICAL PARTS LIST

Note: Although some parts in the schematic diagrams have different names from those in the parts list, there is no problem in replacing parts.

SYMBOL-NO	P-NO	DESCRIPTION
		RESISTOR
VR501	TJ13934	CARBON FILM
		SEMI-CONDUCTORS
D001	TC10752	DIODE 1A5
D002	TC10752	DIODE 1A5
D003	TC10752	DIODE 1A5
D004	TC10752	DIODE 1A5
D006	TC10112	DIODE 1N4148M
D008	TC10112	DIODE 1N4148M
D013	TC10791	RECTIFIER DIODE BA157
D015	TJ15128	DIODE FR202
D016	TC10877	DIODE SB140
D018	TC10604	ZENER DIODE UZ-9.1BSC
D026	TC10607	ZENER DIODE UZ-33BSD
D027	TC10112	DIODE 1N4148M
D028	TC10112	DIODE 1N4148M
D029	TC10112	DIODE 1N4148M
D031	TJ13895	ZENER DIODE MTZJT-775.6B
D051	TE13211	DIODE BA158
D052	TJ13919	ZENER DIODE NTZJT-771.B
D054	TJ15129	DIODE RL151
D055	TC10112	DIODE 1N4148M
D057	TJ13896	ZENER DIODE MTZJT-775.1C
D301	TC10112	DIODE 1N4148M
D302	TC10112	DIODE 1N4148M
D303	TC10112	DIODE 1N4148M
D501	TC10112	DIODE 1N4148M
D555	TJ13898	LED
D701	TC10607	ZENER DIODE UZ-33BSD
⚠ IC001	TE13224	IC LTV-817B-F
IC301	TJ15132	IC LA71091M
IC451	TJ15133	IC LA72653M
IC501	TJ15134	IC QSZAA0RMB020
IC506	TJ15135	IC BD6655FP
⚠ Q001	TJ13922	TRANSISTOR 2SK2599
Q002	TE13243	TRANSISTOR KTC3199(BL)
Q029	TE13243	TRANSISTOR KTC3199(BL)
Q031	TC10778	TRANSISTOR KTC3199
Q052	TJ13923	TRANSISTOR BN1F4M
Q055	TJ13924	TRANSISTOR 2SC536NF
Q056	TC10777	TRANSISTOR 2SD734F-NP-AQ
Q060	TJ15139	TRANSISTOR BN1F4M
Q301	TC10784	TRANSISTOR KTA1266
Q302	TC10783	TRANSISTOR KTC3193
Q303	TC10783	TRANSISTOR KTC3193
Q391	TC10784	TRANSISTOR KTA1266
Q421	TC10784	TRANSISTOR KTA1266
Q422	TC10777	TRANSISTOR 2SD734F-NP-AQ
Q423	TJ13924	TRANSISTOR 2SC536NF
Q424	TJ13924	TRANSISTOR 2SC536NF
Q425	TJ13923	TRANSISTOR BN1F4M
Q501	TE13243	TRANSISTOR KTC3199(BL)
Q503	TJ13925	TRANSISTOR ST-304L-A
Q504	TJ13925	TRANSISTOR ST-304L-A
Q506	TJ15141	TRANSISTOR PT204-6B-12
Q645	TC10783	TRANSISTOR KTC3193
Q646	TC10783	TRANSISTOR KTC3193
Q647	TC10783	TRANSISTOR KTC3193
Q648	TC10783	TRANSISTOR KTC3193
		TRANSFORMER
⚠ T001	TJ15143	TRANSFORMER
		COILS
⚠ L001	TJ15243	FILTER, LINE
L009	TJ13909	COIL
L301	TA12561	COIL 100UH
L303	TJ15137	INDUCTOR 220UH
L304	TJ13909	COIL
L421	TJ13915	COIL
L422	5121289	COIL 22UH
L501	TA12561	COIL 100UH
L502	TA12561	COIL 100UH
L581	TJ13909	COIL
L701	TA12563	COIL 4.7UH
L851	TJ15138	INDUCTOR 1.8UH
L852	TA12562	COIL 12UH
		CRYSTALS
X301	TJ15145	CRYSTAL
X502	TJ15146	CRYSTAL
		MISCELLANEOUS
CN251	TJ13892	CONNECTOR
CN501	TJ13456	CONNECTOR
CN502	TJ15126	CONNECTOR
CN503	TJ15127	CONNECTOR

SYMBOL-NO	P-NO	DESCRIPTION
CN504	TJ13892	CONNECTOR
CN651	TJ15147	CONNECTOR
⚠ F001	TE13223	FUSE 1A/250V
FH001	TE11084	HOLDER
FH002	TE11084	HOLDER
FIP502	TJ15131	DISPLAY, LED
⚠ GP002	TJ13894	GAP
JK751	TJ14089	JACK
JK752	TJ14091	JACK
JK753	TJ15136	JACK
JK754	TJ13906	JACK
JK755	TJ13907	JACK
⚠ SA001	TC10891	SURGE ABSORBER ENC471D-10AC
SW501	TE11957	SWITCH
SW502	TE11957	SWITCH
SW505	TE11957	SWITCH
SW506	TE11161	SWITCH
SW507	TJ15142	SWITCH, MODE
SW671	TE11957	SWITCH
SW672	TE11957	SWITCH
SW673	TE11957	SWITCH
SW674	TE11957	SWITCH
SW676	TE11957	SWITCH
SW701	TE11942	SWITCH
TU701	TJ15144	TUNER UNIT

SYMBOL-NO	P-NO	DESCRIPTION

VT-FX665A/FX665AC

HITACHI

VT-FX665A/FX665AC

VT-FX665A
VT-FX665AC

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